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THE CHIPPING CAMPDEN FORAY, 27–31 MAY 1938

BY C. G. C. CHESTERS

TWENTY-FIVE members and friends took part in the spring foray of 1938 which was held at Chipping Campden during the week-end of 27–31 May 1938, with the headquarters at the King's Arms Guest House. After some days of dry weather the members were welcomed on their arrival by an exceedingly heavy shower of rain.

The first excursion, on Saturday, was to Saintbury coppice, a mixed wood of ash, hazel, elm and oak, which should have provided a large bag of microfungi. Unfortunately, the rain which threatened the previous evening, came down in full volume during the morning and early afternoon. Dr Smith found several specimens of *Puccinia pulverulenta* on *Epilobium montanum* which is one of the rarer hosts of this species. The elms on the valley side provided *Anthostoma gastrinum* and *Cryptosporella hypodermia* but the rain prevented the prolonged search which is necessary to find *Anthostoma melanotes* which is known to occur in this wood. Of the woods visited during the week-end this one deserves further exploration, which I hope it will have on some future foray.

On the following day the party set out for Guiting Wood which was reached after the secretary had piloted the party through some of the less well-known Cotswold lanes—this without any excuses. The wood consists mainly of oak with a few ash trees, some yew, hazel, blackthorn and willow. Early in the day the party was joined by friends from Oxford and Cheltenham and we were all much interested in the considerable defoliation of a certain tree from which the leaves of the upper branches had been ruthlessly stripped. The cause of this is still a mystery. During the day a smut on *Helleborus viridis* occasioned some interest. *Stylonectria applanata* on *Corylus* was found at the top of the wood but unfortunately the absence of the perfect stage prevented the addition of a new record for this country. Among the Pyrenomycetes collected, *Tympanopsis euomphala* deserves notice. In the Cotswolds it is always found in association with old stromata of *Hypoxylon rubiginosum* on ash which seems to be its typical habitat throughout this country. The rain on the previous day prevented the collection from Saintbury of the two related species *Nitschkia cupularis*, on old stromata of *Nectria cinnabarina*, and *Calyculosphaeria tristis*, on old stromata of *Diatrype Stigma* and related fungi, which I have frequently collected in that wood. *Eutypella Prunastri* was very abundant on the old bushes of blackthorn.

The last excursion, on the Monday, to Bourton Woods, was hailed

as the most interesting of the foray. The entrance to the woods from Blockley village certainly provides an excellent hunting ground along the stream side which is covered with luxuriant growth. *Puccinia Aegopodii*, *P. Lychnidearum* and *P. Phalaridis* were collected in this station as well as several Deuteromycetes. Farther in the wood the valley becomes more open and drier, with fewer herbs. On the ash in this region, *Hypoxylon argillaceum* was observed and on the elm *Anthostoma gastrinum*, *Rosellinia aquila* and *Sphaerostilbe aurantiaca* and on the ash *S. flavo-viridis* were collected.

During the week-end several members made excursions to the ridge running from Chipping Campden to Saintbury. Their records are included under the latter place. The grounds of the Guest House provided such domestic microfungi as *Puccinia Antirrhini*, *P. Prunispinosae* (aecidial stage on *Anemone*), *Cystopus candidus* on *Arabis* and *Myrothecium roridum* on *Viola*. So far as I am aware this is the first time that the latter species figures in the foray lists, although it is not a new record for the country.

I am indebted to all the members present for records on which the attached list is based, especially to Miss Sampson, Dr Ramsbottom, Mr Petch, Mr Mason, Mr Deighton and Mr Steven.

List of species gathered during the Foray

B. = Bourton Woods; *Ch.* = Chipping Campden; *G.* = Guiting Wood; *S.* = Saintbury and Weston Park.

HYMENOMYCETES

Armillaria mellea (Vahl) Fr., (rhizomorphs) *G.*, *S.*
Auricularia auricula-Judae (Linn.) Schroet., *S.*, mesenterica (Dicks.) Fr., *S.*
Boletus elegans (Schum.) Fr., *B.*
Coprinus lagopus Fr., *S.*, plicatilis (Curt.) Fr., *S.*
Corticium comedens (Nees.) Fr., *G.*
Dacromyces deliquescens (Bull.) Duby, *S.*
Femsjonia luteoalba Fr., *B.*
Fomes annosus Fr., *B.*, pomaceus (Pers.) Big. & Guill., on *Crataegus*, *G.*
Hymenochaete rubiginosa (Dicks.) Lév., *S.*
Irpex obliquus (Schrad.) Fr., *S.*
Lenzites betulina (Linn.) Fr., *S.*
Omphalia umbellifera (Linn.) Fr., *S.*
Panus stipticus (Bull.) Fr., *S.*
Peniophora cinerea (Fr.) Cke., *S.*, quercina (Pers.) Cke., *S.*
Pistillaria micans (Pers.) Fr., *B.*
Polyporus squamosus (Huds.) Fr., *B.*, *S.*
Polystictus versicolor (Linn.) Fr., *S.*
Stereum hirsutum (Willd.) Fr., *G.*, rugosum (Pers.) Fr., *S.*
Tremella mesenterica (Retz.) Fr., *S.*

UREDINALES

Aecidium leucospermum DC., *G.*
Kuehneola albida (Kuehn.) Magn., *S.*
Melampsora Rostrupii Wagn., aecidia, *G.*, *S.*

Phragmidium disciflorum (Tode) James, *G.*
Puccinia Aegopodii (Schum.) Mart., *B.*, Antirrhini Diet. & Holw., *Ch.*, Arrhenatheri (Kleb.) Erikss., uredo., *B.*, *S.*, Cirsii Lasch, *G.*, glumarum (Sch.) Erikss., uredo., *S.*, holcina Erikss., *S.*, Lychnidearum Link, *B.*, *S.*, Menthae Pers., *Ch.*, obtegens (Link) Tul., *B.*, *S.*, Phalaridis Plow., teleuto and aecidia, *B.*, Pruni-spinosae Pers., *Ch.*, pulverulenta Grev., *S.*, Taraxaci Plow., *B.*, *Ch.*, Violae (Schum.) DC., *G.*, *S.*
Triphragmium Ulmariae (Schum.) Link, *B.*
Uromyces Ficariae (Schum.) Lév., *S.*, Poae Rabenh., *S.*, Scillarum (Grev.) Wint., *G.*

USTILAGINALES

Entyloma Ranunculi (Bon.) Schroet., *G.*
Urocystis Anemones (Pers.) Schroet., *S.*, violae (Sow.) Fisch., *G.*
Ustilago hypodytes (Schlecht.) Fr., *S.*, striaeformis (West.) Niess, on *Agropyron repens*, *S.*, violacea (Pers.) Wint., *S.*

PYRENOMYCETES

Anthostoma gastrinum (Fr.) Sacc., *B.*, *S.*
Bertia moriformis (Tode) de Not., *G.*
Chaetosphaeria phaeostroma Fuck., *G.*
Calospora platanoides (Pers.) Niessl, *G.*
Cryptodiaporthe hysterix (Tode) Pers., *G.*
Cryptosporella hypodermia (Fr.) Sacc., *G.*
Cryptosphaeria eunomia (Fr.) Fuck., *S.*
Daldinia concentrica (Bolt.) Ces. & de Not., *S.*
Diatrype Stigma (Hoff.) Fr., on *Acer campestris*, *G.*, on *Corylus*, *S.*, on *Crataegus*, *B.*, *G.*, *S.*
Diatrypella favacea (Fr.) Ces. & de Not., on *Alnus.*, *B.*, on *Corylus*, *B.*, *G.*, *S.*, on *Fagus*, *B.*, quercina (Pers.) Nits., *G.*
Diaporthe eres Nits., on *Ulmus*, *B.*
Ditopella ditopa (Fr.) Schr., *B.*
Epichloe typhina (Pers.) Tul., on *Dactylis*, *Ch.*, on *Poa trivialis*, *S.*
Erysiphe graminis DC., *B.*, on *Poa trivialis*, *S.*
Eutypella stellulata (Fr.) Sacc., on *Ulmus*, *G.*, *S.*, Prunastri (Pers.) Sacc., *G.*
Hypomyces aurantius (Pers.) Tul., *S.*
Hypoxylon argillaceum (Pers.) Berk., *B.*, fuscum (Pers.) Fr., on *Corylus*, *B.*, *G.*, *S.*, on *Alnus*, *S.*, Howieanum Pk., on *Crataegus*, *S.*, rubiginosum (Pers.) Fr., *B.*, *G.*, semi-immersum Nits., *B.*, *G.*, serpens (Pers.) Fr., *G.*
Leptosphaeria acuta (Mont.) Karst., *R.*
Leptospora spermoides (Hoff.) Fuck., *S.*, on *Fraxinus*, *B.*, *G.*
Melanomma Pulvis-pyrius (Pers.) Fuck., on *Ulmus*, *B.*, *G.*
Mycosphaerella Rumicis, *B.*
Nectria cinnabarina (Tode) Fr., *S.*, sinopica Fr., *B.*
Phyllachora graminis (Pers.) Fuck., *B.*, on *Dactylis*, *S.*
Podosphaera leucotricha (Ell. & Everh.) Schm., *Ch. G.*
Quaternaria dissepta (Fr.) Tul., *B.*, *G.*
Rosellinia aquila (Fr.) de Not., *B.*
Sillia ferruginea (Pers.) Karst., *G.*, *S.*
Sphaerostilbe aurantiaca Tul., *B.*, flavo-viridis Fuck., on *Fraxinus*, *B.*
Sphaerotheca pannosa (Wallr.) Lév., *B.*
Sphaerulina Taxi (Cke.) Massee, *B.*
Tympanopsis euomphala (B. & C.) Starbäck, on *Hypoxylon rubiginosum*, *G.*
Valsa ambiens (Pers.) Fr., on *Crataegus*, *S.*
Xylaria Hypoxylon (Linn.) Grev., *S.*

DISCOMYCETES

Chlorosplenium aeruginosum (Oeder) de Not., *mycelium*, *G.*
Dasyscypha virginea (Batsch) Fuck., *B.*
Encoelia furfuracea (Fr.) Karst., *G.*
Heterosphaeria patella (Tode) Grev., *B.*
Karschia lignyota (Fr.) Sacc., on *Quercus*, *G.*
Mollisia cinerea (Batsch) Karst., *B.*
Propolis faginea (Schrad.) Karst., *B.*
Pseudopeziza Trifolii (Biv.-Bern.) Fuck., on *Trifolium pratensis*, and *T. repens*, *S.*
Rhytisma acerinum (Pers.) Fr., *G.*, *S.*
Taphrina insititia (Sadeb.) Johans., *G.*

HYSTERIALES

Gloniopsis curvata (Fr.) Sacc., on *Acer*, *Prunus spinosa* and *Quercus*, *G.*, on *Prunus spinosa*, *B.*

PHYCOMYCETES

Cystopus candidus (Pers.) de Bary, on *Arabis*, *Ch.*, on *Capsella*, *S.*
Peronospora Ficariae Tul., on *Ranunculus repens*, *S.*, grisea Unger, on *Veronica Beccabunga*, *B.*, parasitica (Pers.) de Bary, on *Sisymbrium officinalis*, *S.*

DEUTEROMYCETES

Beauveria Bassiana (Bals.) Vuill., *S.*
Botrytis cinerea Pers., *S.*
Cercospora Mercurialis Passer., *G.*
Dactylidium dendroides (Bull.) Fr., *S.*
Didymaria Kriegeriana Bresad., *B.*
Diplodia Taxi de Not., *B.*
Mastigosporium album var. muticum Sacc. on *Dactylis*, *S.*
Monilia Crataegi Died., *S.*
Myrothecium roridum Tode, on *Viola*, *Ch.*, *S.*
Myxosporium griseum (Pers.) Sacc., *S.*
Ovularia obliqua (Cke.) Lindau, *B.*, Primulana Karst., *G.*
Phyllosticta hedericola Dur. & Mont., *B.*, *S.*
Ramularia ari Fautr., *G.* Calthae Lindr., *B.*, filaris var. Lappae Bresad., *B.*, Hellebori Fuck., *G.*, Heraclei (Oudem.) Lindau, *B.*, Hypochoeridis Magn., *G.*, Taraxaci Karst., *B.*, *Ch.*
Scolecotrichum graminis Fuck., on *Glyceria aquatica*, *B.*
Septoria anemones Desm., *S.*, ficariae Desm., *Ch.*, hederae Desm., *B.*, violae Westend., *G.*
Spicaria farinosa (Holms.) Vuill., *G.*
Stilbella erythrocephala (Ditm.) Lind., *S.*
Stylonectria applanata v. Hoehnel, *G.*
Tilachlidium tomentosum (Schrad.) Lind., *G.*, *S.*

NOTES ON TYPE SPECIMENS OF BRITISH INOPERCULATE DISCOMYCETES (SECOND PART, NOTES 51–100)

By J. A. NANNFELDT

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THESE notes form the continuation of a series, the first part of which was published in *Trans. Brit. mycol. Soc.* XX. As in the first part the species are arranged alphabetically according to their names in Ramsbottom's list of British Discomycetes (*loc. cit.* IV).

51. ***Cenangium leoninum*** Cke. & Massee in *Grev.* XXI, 72; Massee, *Brit. F. Fl.* IV, 118; Sacc. *Syll. F.* XI, 423 (No. 2642); Boud. *Discom. d'Eur.* p. 160.

To my great surprise this species, the type specimen of which is in the Kew Herbarium, was found to be identical with *Peziza heteromera* Mont., a fungus widely distributed in the American tropics. It is very unlikely that the origin indicated in the diagnosis (Carlisle, coll. Dr Carlyle) is correct.

The taxonomic position of this species has been very much disputed. Durand (*Proc. Amer. Acad. Arts Sci.* XLIX, 1) amends the genus *Midotis* Fr. so as to be typified by this species, and declares *M. verruculosa* B. & C. and *Cordierites lateritia* B. & C. to be synonymous. After a study of authentic specimens and descriptions I am able to confirm this synonymy and to add *Dermatea aureo-tincta* Rehm, *D. pulchra* Starb., *Midotis regularis* Cke. & Phill., *M. guayanensis* Mont., and (ex descr.) *M. Patella* Fr. Still another species, *Encoelia neo-caledonica* Wakef., is closely related and probably conspecific; if this is so, the geographical range of the species will be much extended.

The genus *Midotis* was originally based on *M. Lingua* Fr., a fungus collected by Schleicher in Switzerland. The identity of this species is unknown, but in my opinion it may have been *Wynnella auricula* (Schaeff.) Boud. There are no specimens in the Fries Herbarium, and I have not been able to locate specimens in any Swiss museum. *Peziza heteromera* is certainly vastly different from the type species of *Midotis*, and it is hardly advisable to amend that genus so as to be typified by that species. *Peziza heteromera* Mont. is, moreover, so close to *Encoelia* (Fr.) Karst. that it may be included in that genus as ***Encoelia heteromera*** (Mont.) Nannf. n.comb.

52. ***Ciboria Broomei*** (Phill.) Boud. *Discom. d'Eur.* p. 106.
Hymenoscypha Broomei Phill. *Brit. Discom.* p. 129.
Phialea Broomei Sacc. *Syll. F.* VIII, 264 (No. 1090).
Helotium Broomei Massee, *Brit. F. Fl.* IV, 244.

The history of this species is intricately interwoven with that of *Helotium Sowerbyi* (Cke.) Massee (= *Peziza Sowerbyi* Cke. *Mycogr.* p. 32, and listed by Boudier as *Peziza* amongst the Operculates). Cooke assumed his species to be the *P. araneosa* of Sowerby, but not of Bulliard. It was described and illustrated from specimens collected by Broome at Batheaston and distributed in Rabenh. *F. eur.* No. 30. According to Cooke the asci are cylindrical, the spores obliquely uniseriate and ellipsoidal, 8–9 × 4 μ. The same number of Rabenhorst's exsiccatum had already been studied by Nylander (*Not. Sällsk. F. Fl. Förh.* x, 43, 1869), but Cooke was evidently unaware of this publication and no later British mycologist has noted it. Nylander found the said number to belong to his *Peziza subferruginea*, a species that was later transferred to *Helotium* Fr. and is only doubtfully distinct from *H. sublenticulare* Fr. Rehm (*Discom.* pp. 784–5), who identifies *Peziza subferruginea* with *Helotium sublenticulare*, has examined his copy of Rabenhorst's exsiccatum and finds that it agrees with Nylander's description. So does the Upsala copy, as well as the numerous Broome specimens of *Peziza araneosa* from Batheaston in the British Museum Herbarium. Cooke's description of *P. Sowerbyi* is thus a mystery.

One of the specimens at Kew, bearing the number 948 and Batheaston (?, very illegible) has a label with drawings of asci and spores as well as the figures "0,006 × 0,002 inch", evidently referring to the spores. This specimen is, as it seems, the type of *Hymenoscypha Broomei* Phill., of which the spore measurements were given as 15 × 5 μ. That species is represented in Phillips's herbarium (at Brit. Mus.) only by a water-colour drawing, and the same drawing is found under *Helotium Sowerbyi*, together with specimens from Batheaston (coll. Broome) and from Twycross (coll. Bloxam) labelled *Peziza araneosa*.

Both *Peziza Sowerbyi* Cke., and *Hymenoscypha Broomei* Phill., are thus to be regarded as synonymous with *Peziza subferruginea* Nyl.

53. ***Ciboria ochracea*** (B. & Br.) Massee, *Brit. F. Fl.* IV, 276.
Helotium tuba b. *ochracea* B. & Br. in *Ann. Mag. nat. Hist.* (4), XV, 38 (No. 1486) (nom.nud.).
Hymenoscypha tuba var. B. *ochracea* Phill. *Brit. Discom.* p. 126.

This name is a synonym of *Lachnum pygmaeum* (Fr.) Bres. (comp. notes 56, 64, 65, and 69). Whether it is the true *Peziza pygmaea* Fr. cannot be decided with certainty, as no specimens from Fries seem to exist. As far as I understand, *Ciboria rhizophila* Fuck. is the same species or at least very close to it.

The taxonomic position of this species has been very uncertain, like that of *Lachnum cerinum* (Pers. ex Fr.) Nannf., *L. relicinum* (Fr.) Karst. and many other species of *Lachnum*, for in these species only part of the paraphyses have the lanceolate shape characteristic of that genus. When such paraphyses are very scarce they are easily overlooked, and sometimes they seem to be totally absent; the sum total of characters shows, nevertheless, that the fungus is a species of *Lachnum*. It is to be regretted that it is almost impossible to describe the genus *Lachnum* in such a way that a person who has no previous knowledge of its range of variation can find the true position of specimens without lanceolate paraphyses, but there are in Nature very few large natural groups in which single species are not aberrant in one or more of the leading characters. A classification that does not take this into consideration is artificial.

54. ***Dasyscypha controversa*** (Cke.) Rehm in 26. *Ber. naturh. Ver. Augsburg*, p. 31; Sacc. *Syll. F.* VIII, 447 (No. 1861); Massee, *Brit. F. Fl.* IV, 347; Boud. *Discom. d'Eur.* p. 120.

Peziza controversa Cke. in *Grev.* IV, 41 (nom.nud.).
Lachnum controversum Rehm, *Discom.* p. 904.

This is a species of *Lachnum* as transferred by Rehm (*loc. cit.*).

55. ***Dasyscypha diplocarpa*** (Curr.) Boud. *Discom. d'Eur.* p. 121.

Peziza diplocarpa Curr. in *Trans. Linn. Soc.* XXIV, 153; Cke. *Handb.* p. 688 (No. 2047).
Lachnella diplocarpa Phill. *Brit. Discom.* p. 232; Sacc. *Syll. F.* VIII, 398 (No. 1640).
Diplocarpa Curreyana Massee, *Brit. F. Fl.* IV, 307.

Seaver (*Mycol.* XXIX, 175) recently described and illustrated this species when it was discovered in North America. He maintained *Encoelia Bloxami* Phill. (cf. note 13) as a distinct species, since the colour of its hymenium is described as different ("lurid brown" instead of green). Phillips drew up his description, however, from an old herbarium specimen, and I think no importance should therefore be attributed to this alleged difference.

56. ***Dasyscypha luteola*** (Curr.) Sacc. *Syll. F.* VIII, 440 (No. 1830); Boud. *Discom. d'Eur.* p. 119.

Helotium luteolum Curr. in *Trans. Linn. Soc.* XXIV, 153; Cke. *Handb.* p. 710 (No. 2138); Massee, *Brit. F. Fl.* IV, 240.
Lachnella luteola Phill. *Brit. Discom.* p. 247.

This species is—according to the type specimen at Kew and the published illustration—identical with the fungus generally known as *Lachnum pygmaeum* (Fr.) Bres. (cf. notes 53, 64, 65, and 69).

57. ***Dasyscypha Rhytismatis*** (Phill.) Sacc. *Syll. F.* VIII, 453 (No. 1886); Massee, *Brit. F. Fl.* IV, 329; Boud. *Discom. d'Eur.* p. 120.
Peziza (*Dasyscypha*) *Rhytismae* Phill. in *Grev.* VIII, 101.
Lachnella Rhytismae Phill. *Brit. Discom.* p. 250.

This is a species of *Lachnum* and identical with *L. echinulatum* Rehm (1881) (not *Peziza echinulata* Auersw. 1868). Rehm's specific epithet is antedated by Phillips, and the name thus has to stand as ***Lachnum Rhytismatis*** (Phill.) Nannf. n.comb.

58. ***Dermatea Pseudoplatani*** Phill. in *Grev.* XVII, 45; Sacc. *Syll. F.* VIII, 552 (No. 2274); Boud. *Discom. d'Eur.* p. 160.
Scleroderris Pseudoplatani Massee, *Brit. F. Fl.* IV, 125.

This species belongs to *Pezicula*, but as several such species are described from *Acer*, a definite opinion on the specific status of this form must be postponed until cultural experiments have been carried out.

59. ***Durella livida*** (B. & Br.) Sacc. *Syll. F.* VIII, 795 (No. 3260); Boud. *Discom. d'Eur.* p. 154.
Patellaria livida B. & Br. in *Ann. Mag. nat. Hist.* (2), XIII, 466 (No. 775); Cke. *Handb.* p. 717 (No. 2167); Massee in *J. Linn. Soc.* (*Bot.*), XXXV, 105.
Dermatea livida Phill. *Brit. Discom.* p. 340.
Dermatella livida Sacc. *Syll. F.* VIII, 490 (No. 2027).
Scleroderris livida Massee, *Brit. F. Fl.* IV, p. 127.
Pezicula livida Boud. *Discom. d'Eur.* p. 159.

This is a true *Pezicula* (comp. Nannfeldt, 1932, p. 93) and was subjected to thorough studies in recent papers by Mary Gregor Wilson (*Ann. Bot.* XLV, as *Dermatea livida*) and Wollenweber (*Arb. biol. Reichsanstalt f. Land- u. Forstwirtschaft*, XXII).

60. ***Ephelina Prunellae*** Phill. ex A. L. Sm. in *Trans. Brit. mycol. Soc.* III, 114.

This species is identical with *Beloniella Brunellae* Lind (*Ann. mycol.* V, 274), the description of which was published a year earlier. It should be placed in the genus *Fabraea* and its valid name becomes thus ***F. Brunellae*** (Lind) Nannf. n.comb.
Its mycelial (and conidial) stage, *Asteroma Prunellae* Purt., has long been known. (Cf. e.g. Grove, *Brit. Stem- and Leaf-fungi*, II, 140.)

61. ***Erinella apala*** (***"hapala"***) (B. & Br.) Sacc. *Syll. F.* VIII, 509 (No. 2099); Massee, *Brit. F. Fl.* IV, 303; Boud. *Discom. d'Eur.* p. 122.

Peziza apala B. & Br. in *Ann. Mag. nat. Hist.* (2), VII, 180 (No. 561); Cke. *Handb.* p. 691 (No. 2060).
Lachnella apala Phill. *Brit. Discom.* p. 253.

This is a true species of *Lachnum*, though it has septate spores (cf. Nannfeldt, 1932, p. 262). It is identical with *Erinella juncicola* (Fuck.) Rehm, but as this epithet is the earlier one, the valid name is *Lachnum apalum* (B. & Br.) Nannf. (*Sv. Bot. Tidskr.* XXX, 299).

62. ***Helotium aquaticum*** Curr. in *Trans. Linn. Soc.* XXIV, 154; Cke. *Handb.* p. 711 (No. 2139); Massee, *Brit. F. Fl.* IV, 251; Boud. *Discom. d'Eur.* p. 114.

Hymenoscypha aquatica Phill. *Brit. Discom.* p. 134.
Phialea aquatica Sacc. *Syll. F.* VIII, 267 (No. 1105).

I could not find any fruit bodies on the type specimen (at Kew), but the description leaves little doubt that this species was based on dwarfed specimens of *Ombrophila Clavus* (A. & S. ex Fr.) Cke.

63. ***Helotium Calyculus*** (Sow.) Fr. *S. Veg. Scand.* p. 355; Berk. *Outl.* p. 372; Cke. *Handb.* p. 711 (No. 2142); Massee, *Brit. F. Fl.* IV, 248; Boud. *Discom. d'Eur.* p. 114.

Peziza Calyculus "Sw." in Sow. *Engl. F.* pl. 116; Berk. in *Engl. Fl.* V, pt. 2, p. 202.
Hymenoscypha Calyculus Phill. *Brit. Discom.* p. 136.
Phialea Calyculus Sacc. *Syll. F.* VIII, 267 (No. 1106).

Sowerby's specimen (at Kew) shows a fungus closely related to, or (probably) identical with, *Helotium virgultorum* (Vahl ex Fr.) Fr. I must refrain, however, from a definite opinion until I have finished my studies on the genus *Helotium*. It seems to me that far too many branch-inhabiting species of *Helotium* are listed in the floras.

64. ***Helotium flexipes*** Cke. & Phill. ap. Phill. in *Grev.* XIX, 106; Boud. *Discom. d'Eur.* p. 114.

Phialea flexipes Sacc. *Syll. F.* X, 9 (No. 4497).

This is another synonym of *Lachnum pygmaeum* (Fr.) Bres. (cf. notes 53, 56, 65, and 69), though the description is very deficient. The substratum is coniferous wood.

65. ***Helotium Hedwigii*** (Phill.) Massee, *Brit. F. Fl.* IV, 243; Boud. *Discom. d'Eur.* p. 113.

Hymenoscypha Hedwigii Phill. *Brit. Discom.* p. 130.
Phialea Hedwigii Sacc. *Syll. F.* VIII, 260 (No. 1075).

The following particulars about the type specimen are given in the original description: "On twigs of hazel, May" and "Hanwood, near Shrewsbury". In Phillips's herbarium (Brit. Mus.) the species is represented only by a water-colour drawing dated "May 1876" and

a specimen labelled: "On hazel, Hanwood, June 1876." The latter specimen matches the drawing and the description so well that I do not hesitate to regard them as the same species, which furthermore proves to be identical with *Lachnum pygmaeum* (Fr.) Bres. (cf. notes 53, 56, 64, 69).

66. ***Hyalinia albella*** (With.) Boud. *Discom. d'Eur.* p. 103.
Peziza "albella With. *Arr.* IV, 350" ex Fr. *Syst. mycol.* II, 146.
Helotium albellum Karst. *Myc. fenn.* I, 116.
Pezizella albella Sacc. *Syll. F.* VIII, 280 (No. 1161).
Pseudopeziza albella Massee, *Brit. F. Fl.* IV, 202.

As far as I can ascertain no such species was ever described by Withering. In the publication cited (Ed. III, 1796) a *Peziza albida* (*sic*!) is found on p. 350, but this has apothecia $\frac{1}{4}$–$\frac{3}{4}$ in. in diameter, and seems to be identical with, or closely allied to, *Peziza Adae* Sadl. Karsten's and Massee's *Helotium albellum* (resp. *Pseudopeziza albella*) is *Allophylaria vulgaris* (Fr.) Nannf. Fries (*loc. cit.*) puts "*Peziza albella* With." as a synonym to his *Peziza vulgaris*. In the *Index alphabeticus* to *Systema mycologicum* the correct name *Peziza albida* With. is found, and not *albella*.

67. ***Hyalinia auricolor*** (Blox. ap. B. & Br.) Boud. *Discom. d'Eur.* p. 104. *Peziza* (*Mollisia*) *auricolor* Blox. ap. B. & Br. in *Ann. Mag. nat. Hist.* (3), XV, 445 (No. 1068); Cke. *Handb.* p. 700 (No. 2098).
Calloria auricolor Phill. *Brit. Discom.* p. 334.
Orbilia auricolor Sacc. *Syll. F.* VIII, 625 (No. 2575); Massee, *Brit. F. Fl.* IV, 148.

As I surmised earlier (Nannfeldt, 1932, p. 254), this species is identical with *Orbilia inflatula* Karst. It is a true *Orbilia*, the valid name of which is *Orbilia auricolor* (Blox. ap. B. & Br.) Sacc.

68. ***Hyalinia ulcerata*** (Phill. & Plowr.) Boud. *Discom. d'Eur.* p. 104.
Peziza (*Mollisia*) *ulcerata* Phill. & Plowr. in *Grev.* IV, 122.
Calloria ulcerata Phill. *Brit. Discom.* p. 330.
Orbilia ulcerata Sacc. *Syll. F.* VIII, 630 (No. 2595).

As generally accepted, this species is identical with *Peziza Tripolii* B. & Br. It may belong to the genus *Laetinaevia* Nannf. (cf. note 91).

69. ***Hyphoscypha nuda*** (Phill.) Boud. *Discom. d'Eur.* p. 122.
Peziza nuda Phill. in *Scot. Nat.* VI, 124; Phill. & Plowr. in *Grev.* VIII, 101.
Lachnella nuda Phill. Brit. Discom. p. 247.
Helotium nudum Massee, *Brit. F. Fl.* IV, 498.
Helotium Phillipsii Sacc. *Syll. F.* VIII, 220 (No. 893).

No specimen seems to exist of this species, but a water-colour drawing in Phillips's herbarium (Brit. Mus.) as well as the description indicate clearly *Lachnum pygmaeum* (Fr.) Bres. (cf. notes 53, 56, 64, and 65).

70. ***Keithia tetraspora*** (Phill. & Keith) Sacc. *Syll. F.* x, 50 (No. 4649); Massee, *Brit. F. Fl.* iv, 49; Boud. *Discom. d'Eur.* p. 179.
Phacidium tetrasporum Phill. & Keith, *Gard. Chron.*, n.s., xiv, 308; Phill. *Brit. Discom.* p. 388.

This species was fully described by Durand (*Mycol.* v, 8–9) in a monograph of the genus *Keithia*.

71. ***Lachnella tricolor*** (Sow. ex Fr.) Phill. *Brit. Discom.* p. 240; Sacc. *Syll. F.* viii, 394 (No. 1621); Boud. *Discom. d'Eur.* p. 123.
Peziza tricolor Sow. *Engl. F.* tab. 369; Fr. *Syst. mycol.* ii, 134; Berk. in *Engl. Fl.* v, pt. 2, p. 204; Berk. *Outl.* p. 368; Cke. *Handb.* p. 687 (No. 2042).
Dasyscypha tricolor Massee, *Brit. F. Fl.* iv, 364.

No authentic specimens could be found, but the description leaves no doubt of the identity of Sowerby's fungus. The specimens in Moug. & Nestl. *St. crypt.* No. 1189, show, as Rehm has already pointed out, that *Peziza Godroniana* Mont. is the same fungus, and the description of *Dasyscypha coerulea* Schroet. (*Schles. Krypt.-Fl.* iii, pt. 2, p. 86) indicates another synonym. The true taxonomic position of this species is still obscure to me.

72. ***Lecanidion minutissimum*** (Phill.) Sacc. *Syll. F.* viii, 799 (No. 3278); Boud. *Discom. d'Eur.* p. 155.
Patellaria minutissima Phill. *Brit. Discom.* p. 362; Massee, *Brit. F. Fl.* iv, 106.

No specimen, but only a water-colour drawing, could be found in Phillips's herbarium (Brit. Mus.). Rehm (*Discom.* p. 286) surmises that this species is identical with *Durella commutata* Fuck., and the drawing strengthens this opinion. It is hardly possible that the description is correct in stating that the minute spores ($6 \times 3\,\mu$) finally become 3-septate.

73. ***Micropodia aspidiicola*** (B. & Br.) Boud. *Discom. d'Eur.* p. 128.
Peziza (Dasyscyphae) aspidiicola B. & Br. in *Ann. Mag. nat. Hist.* (2), xiii, 465 (No. 771); Berk. *Outl.* p. 369; Cke. *Handb.* p. 691 (No. 2058).
Lachnella aspidiicola Phill. *Brit. Discom.* p. 245.
Dasyscypha aspidiicola Sacc. *Syll. F.* viii, 451 (No. 1878); Massee, *Brit. F. Fl.* iv, 338.

Von Höhnel's statement that this species is identical with *Peziza chrysostigma* Fr. is correct (comp. note 77).

74. ***Mollisia aquosa*** (B. & Br.) Phill. *Brit. Discom.* p. 172; Sacc. *Syll. F.* VIII, 333 (No. 1382); Massee, *Brit. F. Fl.* IV, 206; Boud. *Discom. d'Eur.* p. 137.

Peziza (*Mollisia*) *aquosa* B. & Br. in *Ann. Mag. nat. Hist.* (4), VII, 434 (No. 1326).

This is an addition to the long list of synonyms to *Mollisia ligni* (Desm.) Karst., given by von Höhnel (*Fr. z. M.* No. 1112) (cf. also note 76).

75. ***Mollisia jugosa*** (Phill. & Plowr.) Phill. *Brit. Discom.* p. 184; Massee, *Brit. F. Fl.* IV, 220; Boud. *Discom. d'Eur.* p. 139.

Peziza (*Mollisia*) *jugosa* Phill. & Plowr. in *Grev.* XIII, 74.
Pyrenopeziza jugosa Sacc. *Syll. F.* VIII, 355 (No. 1466).

No Discomycete could be detected on the type specimen, stems, apparently of *Digitalis purpurea*. The only fungus found was an immature pseudosphaerious one, seated in darkened spots. The description refers probably to that.

76. ***Mollisia lignicola*** Phill. in *Grev.* XV, 113; Phill. *Brit. Discom.* p. 180; Rehm, *Discom.* p. 522; Massee, *Brit. F. Fl.* IV, 206; Boud. *Discom. d'Eur.* p. 139.

Pyrenopeziza lignicola Sacc. *Syll. F.* VIII, 366 (No. 1511).

Von Höhnel (*Fr. z. M.* No. 1112) pointed out that this species is identical with *Mollisia ligni* (Desm.) Karst. and the examination of the type specimen (in Brit. Mus.) proves this to be correct. *Mollisia ligni* is the valid name.

77. ***Mollisiella filicum*** (Phill. ap. Phill. & Plowr.) Boud. *Discom. d'Eur.* p. 142.

Peziza (*Mollisia*) *filicum* Phill. ap. Phill. & Plowr. in *Grev.* XIII, 74.
Mollisia filicum Phill. *Brit. Discom.* p. 191; Massee, *Brit. F. Fl.* IV, 217.
Pezizella filicum Sacc. Syll. F. VIII, 281 (No. 1166).

This species is identical with *Peziza chrysostigma* Fr. as understood by von Höhnel (*Mitt. bot. Inst. techn. Hochsch. Wien*, III, 75), who placed it in the genus *Phialea* as a somewhat aberrant member of that genus, *P. chrysostigma* (Fr.) v. Höhn. There are, unfortunately, no specimens in the Fries herbarium, but his description leaves no doubt as to the correctness of von Höhnel's interpretation. The species in question in my opinion is better placed in the genus *Allophylaria* as ***A. chrysostigma*** (Fr.) Nannf. n.comb. (cf. Nannfeldt, 1932, p. 290).

As von Höhnel pointed out, *Peziza versicolor* Desm. is the same species, but Phillips's *Mollisia versicolor* is *Hyaloscypha flaveola* (Cke.) Nannf. (comp. note 98). On the other hand, Massee (*Brit. F. Fl.* IV,

218) described as *Mollisia versicolor* (Desm.) Phill., the original species, though he gave the spore measurements rather large.

Peziza aspidiicola B. & Br. is also this species (comp. note 77).

The descriptions of *Calloria chrystigma* Phill. and *Mollisia chrysostigma* Massee refer to *Hyaloscypha flaveola* (cf. note 98).

78. ***Pachydisca badia*** (Phill.) Boud. *Discom. d'Eur.* p. 94.
Helotium badium Phill. *Brit. Discom.* p. 167; Sacc. *Syll. F.* VIII, 246 (No. 1013); Massee, *Brit. F. Fl.* IV, 234.

I cannot find any difference between this species and *Helotium salicellum* Fr. as understood by Nylander, Karsten, Rehm, Massee, etc. The fruit-bodies are somewhat dark, but this may be due to great age and poor preservation.

79. ***Pachydisca fibuliformis*** (Bolt. ex Fr.) Boud. *Discom. d'Eur.* p. 94.
Helvella fibuliformis Bolt. *Hist. Fung. Halifax*, p. 176.
Peziza Helotium fibuliformis Fr. *Syst. mycol.* II, 155; Berk. in *Engl. Fl.* V, pt. 2, p. 207.
Helotium fibuliforme Berk. *Outl.* p. 371; Cke. *Handb.* p. 707 (No. 2126); Sacc. *Syll. F.* VIII, 250 (No. 1032); Phill. *Brit. Discom.* p. 156; Massee, *Brit. F. Fl.* IV, 270.

No authentic material of this species seems to exist, but the description very strongly suggests *Vibrissea truncorum* A. & S. ex Fr.

The fungus found by Phillips, and described by him as probably identical with Bolton's species, seems to have been *Ombrophila Clavus* (A. & S. ex Fr.) Cke.

80. ***Pachydisca sclerotioides*** (Berk.) Boud. *Discom. d'Eur.* p. 94.
Peziza sclerotioides Berk. in *Engl. Fl.* V, pt. 2, p. 208.
Helotium sclerotioides Berk. *Outl.* p. 371; Cke. *Handb.* p. 708 (No. 2128); Phill. *Brit. Discom.* p. 170; Sacc. *Syll. F.* VIII, 236 (No. 236 (No. 960).

As Massee stated [*loc. cit.* and *J. Linn. Soc.* (*Bot.*), XXXV, 116], this species is not a Discomycete but a sclerotium.

81. ***Pezicula dryina*** (Cke. ap. Phill.) Sacc. *Syll. F.* VIII, 313 (No. 1302); Boud. *Discom. d'Eur.* p. 159.
Dermatea dryina Cke. in *Grev.* VII, 62 (nom. nud.); Cke. ap. Phill. *Brit. Discom.* p. 340.
Cenangium dryinum Massee, *Brit. F. Fl.* IV, 117.

This is a true *Pezicula*, but specific limits within that genus can be drawn only after extensive and thorough cultural studies. Thus the question of its possible identity with other species of *Pezicula* described from oak must be left open for the present.

82. ***Pezicula Fagi*** (Phill.) Boud. *Discom. d'Eur.* p. 159.
Dermatea Fagi Phill. *Brit. Discom.* p. 344.
Dermatella (*Dermatina*) *Fagi* Sacc. *Syll. F.* VIII, 492 (No. 2033).
Scleroderris Fagi Massee, *Brit. F. Fl.* IV, 127.

A true *Pezicula*, probably identical with *P. carpinea* (Pers. ex Fr.) Tul. (cf. Wollenweber, *Arb. biol. Reichsanstalt f. Land- u. Forstwirtschaft* XXII).

83. ***Pezicula rhabarbarina*** (Berk.) Boud. *Discom. d'Eur.* p. 159.
Peziza rhabarbarina Berk. in *Engl. Fl.* V, pt. 2, p. 197.
Patellaria rhabarbarina Berk. *Outl.* p. 373; Cke. *Handb.* p. 717 (No. 2164).
Lachnella rhabarbarina Fr. *S. Veg. Scand.* p. 365.
Dermatea rhabarbarina Phill. *Brit. Discom.* p. 343.
Pezicula rhabarbarina Fuck. *Symb. myc.* p. 278; Sacc. *Syll. F.* VIII, 311 (No. 1295).

This is a typical *Pezicula*, the valid name of which is *P. Rubi* (Lib.) Niessl (cf. Nannfeldt, 1932, p. 94, and note 35; Wollenweber, *loc. cit.*).

84. ***Peziza asterostoma*** Phill. in *Grev.* VIII, 140.
Dasyscypha asterostoma Massee, *Brit. F. Fl.* IV, 339.

This fungus has generally been united with *Peziza spirotricha* Oudem. and was cited in Ramsbottom's list as *Urceolella spirotricha* (Oudem.) Boud. These fungi are closely related and both belong to the genus *Unguicularia* v. Höhn., but the British fungus has longer hairs than the Dutch one, and may be specifically distinct (cf. Massee, *loc. cit.*). The forms of *Unguicularia* are in great need of a critical comparison.

85. ***Phacidium Calthae*** Phill. ap. Stevenson, *Myc. Scot.* p. 344; Phill. in *Grev.* VIII, 103; Phill. *Brit. Discom.* p. 391; Sacc. *Syll. F.* VIII, 720 (No. 2954); Boud. *Discom. d'Eur.* p. 178.
Pseudopeziza Calthae Massee, *Brit. F. Fl.* IV, 192.

This species belongs to the Pseudopezizoideae as delimited by me (Nannfeldt, 1932, pp. 175 *seqq.*). It is identical not only with *Naevia Calthae* (Phill.?) Karst. but also—in spite of Rehm's opinion (*Discom.* p. 601) to the contrary—with *Fabraea Rousseauana* Sacc. & Bomm. As the spores may finally become 1-septate, its position is in *Fabraea*, if there are sufficient reasons for keeping *Fabraea* generically distinct from *Pseudopeziza*. Phillips's specific epithet has priority, and the valid name of the species is thus ***Fabraea Calthae*** (Phill.) Nannf. n.comb.

86. ***Phacidium humigenum*** Cke. & Massee in *Grev.* XVI, 78; Sacc. *Syll. F.* VIII, 717 (No. 2937); Boud. *Discom. d'Eur.* p. 178.
Phacidium terrestre var. *humigenum* Massee, *Brit. F. Fl.* IV, 58.

This is only the common *Podophacidium xanthomela* (Pers. ex Fr.) Schroet. Numerous varieties and related species have been described but I am unable to find any tangible differences.

I have studied the type specimen of *Peziza xanthomela* in Herb. Persoon (Leiden No. 910, 261-830) and this shows the common interpretation of Persoon's name to be correct.

87. ***Phacidium simulatum*** B. & Br. in *Ann. Mag. nat. Hist.* (3), VII, 451 (No. 967); Cke. *Handb.* p. 754 (No. 2273); Phill. *Brit. Discom.* p. 390; Sacc. *Syll. F.* VIII, 718 (No. 2943); Boud. *Discom. d'Eur.* p. 178.

Pseudopeziza simulata Massee, *Brit. F. Fl.* IV, 198.
Pyrenopeziza simulata Rehm, *Discom.* p. 627 (nom. eventuale).

This is a species of *Pyrenopeziza*, belonging to the same group as *P. Bubakii* Klika, *P. Euphrasiae* (Fuck.) J. Kze., etc. (cf. Nannfeldt, 1932, p. 141). The host-plant is *Satureja vulgaris* (= *Clinopodium vulgare*) and the fungus is doubtfully distinct from *Pyrenopeziza Lycopodis* ("*Lycopi*" and "*Lycopsidis*") Rehm on *Lycopus europaeus*, *Pyrenopeziza pusilla* Sacc. & Speg. on *Mentha* sp., and *Pyrenopeziza labiatarum* (Ces.) Rehm on *Mentha rotundifolia*.

88. ***Phaeangella Ulicis*** (Cke.) Massee, *Brit. F. Fl.* IV, 136; Boud. *Discom. d'Eur.* p. 164.

Dermatea Ulicis Cke. in *Grev.* III, 186; Phill. *Brit. Discom.* p. 339.
Cenangella (*Phaeangella*) *Ulicis* Sacc. *Syll. F.* VIII, 592 (No. 2450).

This is a species of *Encoelia*. It seems to be very close to *Cenangium Sarothamni* Fuck., at least as described by Rehm (*Discom.* p. 223). Massee & Crossland (*Naturalist*, 1901, p. 179) evidently had a different fungus in mind.

89. ***Pirottuea Vectis*** (B. & Br.) Phill. *Brit. Discom.* p. 284; Sacc. *Syll. F.* VIII, 389 (No. 1605); Boud. *Discom. d'Eur.* p. 135.

Peziza (*Dasyscyphae*) *Vectis* B. & Br. in *Ann. Mag. nat. Hist.* (3), VII, 449 (No. 957); Cke. *Handb.* p. 692 (No. 2063); Massee in *J. Linn. Soc.* (*Bot.*), XXXV, 92.
Echinella Vectis Massee, *Brit. F. Fl.* IV, 304.

This is a true *Pirottaea*, restricted to stems of *Centaurea*. Its valid name is *Pirottaea brevipila* (Rob.) Boud. (cf. Nannfeldt, 1932, p. 131). This is the first species in Massee's new genus *Echinella*, "allied to the genus *Pirottaea*, but differing in the distinctly septate spores" (*Brit. F. Fl.* IV, 304). As I have shown previously, spore septation is a very fallacious character, and especially so amongst the Discomycetes. Moreover, Massee placed very different species in the same genus, viz. *Echinella setulosa* Massee & Crossl. (= *Trichobelonium obscurum*

Rehm, note 19), *E. Senecionis* (Cke. & Phill.) Massee (=*Pirottaea Senecionis* (Cke. & Phill.) Nannf., Nannfeldt, 1932, p. 134), *Echinella Crosslandii* Massee (=*Lachnum corticale* (Fr.) Nannf., note 17), and *Echinella Stockii* (Cke. & Phill.) Massee (=*Pyrenopeziza* sp., note 27).

90. ***Pseudopeziza Alismatis*** (Phill. & Trail) Sacc. *Syll. F.* VIII, 728 (No. 2986); Massee, *Brit. F. Fl.* IV, 194; Boud. *Discom. d'Eur.* p. 180.

Mollisia (*Pseudopeziza*) *Alismatis* Phill. & Trail in *Grev.* XVI, 93.

This is no *Pseudopeziza* but belongs to the genus *Pyrenopeziza* Fuck., emend. Nannf.

91. ***Pseudopeziza Tripolii*** ("*Trifolii*") (B. & Br.) Massee, *Brit. F. Fl.* IV, 201.

Peziza (*Mollisia*) *Tripolii* B. & Br. *Ann. Mag. nat. Hist.* (4), XVII, (No. 1623).

This is identical with *Peziza ulcerata* Phill. & Plowr. and may belong to the genus *Laetinaevia* Nannf. (cf. note 68).

92. ***Pyrenopeziza digitalina*** (Phill.) Sacc. *Syll. F.* VIII, 358 (No. 1477); Boud. *Discom. d'Eur.* p. 133.

Peziza atrata var. *digitalina* Phill. *Elv. Brit.* No. 128.
Mollisia digitalina Phill. *Brit. Discom.* p. 190; Massee, *Brit. F. Fl.* IV, 211.

This is a typical member of the genus *Pyrenopeziza*, belonging to that homogeneous group which I have exemplified, for example, by *P. Arctii* (Phill.) Nannf. and *P. Chamaenerii* Nannf. (Nannfeldt, 1932, p. 140). *P. digitalina* is most probably restricted to stems of *Digitalis*. The same species is distributed in Syd. *Mycoth. germ.* No. 327 as *Mollisia atrata* f. *digitalina*.

93. ***Pyrenopeziza urticicola*** (Phill.) Boud. *Discom. d'Eur.* p. 135.

Peziza urticicola Phill. *Elv. Brit.* No. 177.
Mollisia urticicola Phill. *Brit. Discom.* p. 177; Sacc. *Syll. F.* VIII, 323 (No. 1341); Massee, *Brit. F. Fl.* IV, 210.

This is a true *Pyrenopeziza*, belonging to the same group as the preceding one. The morphological differences are very feeble between most of these species, which are, however, restricted to certain host-plants.

When I recently reported this species as new to Sweden (*Sv. Bot. Tidskr.* XXX, 304), it was by an inexcusable oversight cited as "*Pyrenopeziza urticicola* (Phill.) Nannf. n.comb."

94. ***Rhytisma Empetri*** B. White ex B. & Br. in *Ann. Mag. nat. Hist.* (4), XVII, 145 (No. 1630); Sacc. *Syll. F.* VIII, 761 (No. 3125); Boud. *Discom. d'Eur.* p. 185.

This fungus is not a Discomycete but a conidial stage of unknown relationship. It is identical with *Melasmia Empetri* Magn.

95. ***Trichopeziza carinata*** Cke. & Massee in *Grev.* XXI, 121; Sacc. *Syll. F.* XI, 412 (No. 2563); Boud. *Discom. d'Eur.* p. 131.

Dasyscypha carinata Massee, *Brit. F. Fl.* IV, 339.

This is a species of *Unguicularia* and cannot be separated from the octosporous main form of *Dasyscypha Winteriana* Rehm. Its valid name is ***Unguicularia Winteriana*** (Rehm) Nannf. n.comb.

96. ***Trichopeziza Grevillei*** (Berk.) Sacc. *Syll. F.* VIII, 407 (No. 1674); Boud. *Discom. d'Eur.* p. 131.

Peziza Grevillei Berk. in *Engl. Fl.* V, pt. 2, p. 198; Berk. *Outl.* p. 369; Cke. *Handb.* p. 690 (No. 2056).
Mollisia Grevillei Phill. *Brit. Discom.* p. 180.
Dasyscypha Grevillei Massee, *Brit. F. Fl.* IV, 359.

The examination of the type specimen shows this species to be a delicate *Lachnum*, very close to, or perhaps identical with, *L. brevipilum* v. Höhn. It is probably also conspecific with *Peziza Berkeleyi* Blox. ap. B. & Br. (cf. note 97).

97. ***Urceolella Berkeleyi*** (Blox. ap. B. & Br.) Boud. *Discom. d'Eur.* p. 130.

Peziza (*Dasyscyphae*) *Berkeleii* Blox. ap. B. & Br. in *Ann. Mag. nat. Hist.* (2), XIII, 464 (No. 770); Berk. *Outl.* p. 369; Cke. *Handb.* p. 690 (No. 2057).
Lachnella Berkeleii Phill. *Brit. Discom.* p. 270.
Trichopeziza Berkeleyi Sacc. *Syll. F.* VIII, 407 (No. 1673).
Dasyscypha Berkeleyi Massee, *Brit. F. Fl.* IV, 358.

The type specimen shows this species to be a very delicate *Lachnum*, hardly distinct from *L. brevipilum* v. Höhn. Whether it is specifically distinct from *Peziza Grevillei* Berk. (cf. note 96) and from *Calloria coniicola* Cke. & Phill. ap. Phill. (cf. note 4), is extremely doubtful.

98. ***Urceolella? flaveola*** (Cke.) Boud. *Discom. d'Eur.* p. 129.

Peziza (*Mollisia*) *flaveola* Cke. in *Grev.* I, 131.
Mollisia flaveola Phill. *Brit. Discom.* p. 192.
Pezizella flaveola Sacc. *Syll. F.* VIII, 288 (No. 1203).

This species was dealt with by von Höhnel (*Mitt. bot. Inst. techn. Hochsch. Wien*, III, 75), who gave a very good description of it. He placed it in *Dasyscypha* subgen. *Dasypezis*, together with *D. dematiicola*

(B. & Br.) v. Höhn. and *D. resinifera* v. Höhn. I have demonstrated (Nannfeldt, 1932, pp. 260–265) that neither *Dasyscypha* nor *Dasypezis* can be used in von Höhnel's sense and that the three species cited all fall into the genus *Hyaloscypha* Boud., emend. Nannf. The species dealt with here will then become ***Hyaloscypha flaveola*** (Cke.) Nannf. n. comb.

As pointed out in part already by von Höhnel, *Calloria chrysostigma* sensu Phill. and *Mollisia chrysostigma* sensu Massee (not *Peziza chrysostigma* Fr. nor *Helotium chrysostigmum* Karst.) as well as *Mollisia versicolor* sensu Phill. (not sensu Massee) are all this species (cf. note 77).

99. ***Urceolella viburnicola*** (B. & Br.) Boud. *Discom. d'Eur.* p. 130.
Peziza viburnicola B. & Br. in *Ann. Mag. nat. Hist.* (3), XVIII (No. 1170); Cke. *Handb.* p. 706 (No. 2120).
Pyrenopeziza viburnicola Sacc. *Syll. F.* VIII, 366 (No. 1170).
Mollisia viburnicola Phill. *Brit. Discom.* p. 185; Massee, *Brit. F. Fl.* IV, 213.

The earliest name of this species according to von Höhnel (*Fr. z. M.* No. 1111) is *Phacidium commodum* Rob. It belongs to *Pyrenopeziza*, and its valid name is thus *Pyrenopeziza commoda* (Rob.) Nannf. (cf. Nannfeldt, 1932, p. 144, where a full description is given).

The host is always *Viburnum Lantana.*

100. ***Velutaria fraxinicola*** (B. & Br.) Boud. *Discom. d'Eur.* p. 158.
Peziza (*Encoelium*) *fraxinicola* B. & Br. in *Ann. Mag. nat. Hist.* (3), XVIII (No. 1160); Cke. *Handb.* p. 678 (No. 2011).
Lachnella fraxinicola Phill. *Brit. Discom.* p. 275; Sacc. *Syll. F.* VIII, 396 (No. 1628)

The valid name of this species is *Velutaria rufo-olivacea* (A. & S. ex Fr.) Fuck. (cf. Nannfeldt, 1932, p. 302, and note 38).

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CONTRIBUTIONS TO THE LIFE HISTORY OF CERTAIN COPROPHILOUS FUNGI[1]

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(With Plates VI and VII and 8 Text-figures)

In view of the present fragmentary knowledge of the Sordariaceae and allied groups it was considered that those species which are easily cultivated on artificial media would repay investigation.

The list of species studied and described is shown in the following table:

Species	Source	Development studied by
Sordaria fimicola Rob. (8-spored)	Rabbit pellets	Dangeard, Faull, Gries, Gilkinet, Piehl, Ritchie, Satina
S. fimicola Rob. (4-spored)	Culture from soil	—
S. macrospora Auersw.	Rabbit pellets	Dangeard
Podospora anserina Rabh.	Horse dung and later material from Dowding	Ames, Dodge, Dowding, Wolf, Satina
P. minuta Fuck. (4-spored)	Rabbit pellets	Gilkinet
P. minuta Fuck. (8-spored)	Rabbit pellets	—
Philocopra pleiospora Wint.	Rabbit pellets	—
P. setosa Wint.	Rabbit pellets	—
P. curvicolla Wint.	Rabbit pellets	—
Sporormia intermedia Auersw.	Rabbit pellets	Dangeard, Satina
S. bipartis Cane	Rabbit pellets	—
Chaetomium globosum Knz.	Damp wall paper	—
C. murorum Corda	Book that had been immersed in sea water	—
C. coprinum Bainier	Rabbit pellets	—
C. bostrychodes Zopf	Rabbit pellets from hutch sweepings	—
C. cochliodes Pall.	Dickson	—
Saltant 4	,,	—
Saltant 7	,,	—
Saltant 33	,,	—
Saltant S.S. 8	,,	—

Nomenclature

The following nomenclature has been used:

Sordaria: Species with not more than eight spores to the ascus, spores without appendages.

Podospora: Species with not more than eight spores to the ascus, spores with appendages.

[1] Part of a Thesis awarded the degree of Ph.D. in the University of London.

Philocopra: Species with more than eight spores to the ascus. Cane (1934) includes all these species in the genus *Sordaria*. The specimens described in the present work have been identified at the British Museum.

Literature

The greater part of the literature dealing with the Sordariaceae and Chaetomiaceae consists of descriptions of perithecia, asci and spores or systems of classification.

Methods

The media employed were:

(1) Decoction of rabbit dung made up with 3 % agar.
(2) 0·1 % glucose added to this decoction.
(3) A synthetic medium consisting of:

Magnesium sulphate	0·05 g.
Potassium nitrate	0·95 g.
Tribasic potassium phosphate	0·05 g.
Sodium taurochlolate	0·1 g.
Water	100 c.c.
Agar	3 g.

(4) Potato agar (Gwynne-Vaughan & Barnes, 1937, p. 378).

Fragments of filter paper were included in all cultures.

Most of the plates were kept at laboratory temperature in diffuse light. Cultures of *Philocopra pleiospora* and *P. curvicolla* were kept near the window as these fungi grew better in direct light.

Living material was examined in water, dilute iodine, dilute acetic acid or a solution of water blue. The fixatives used were medium strength chrom-acetic acid and Flemming's fluid diluted with an equal quantity of water.

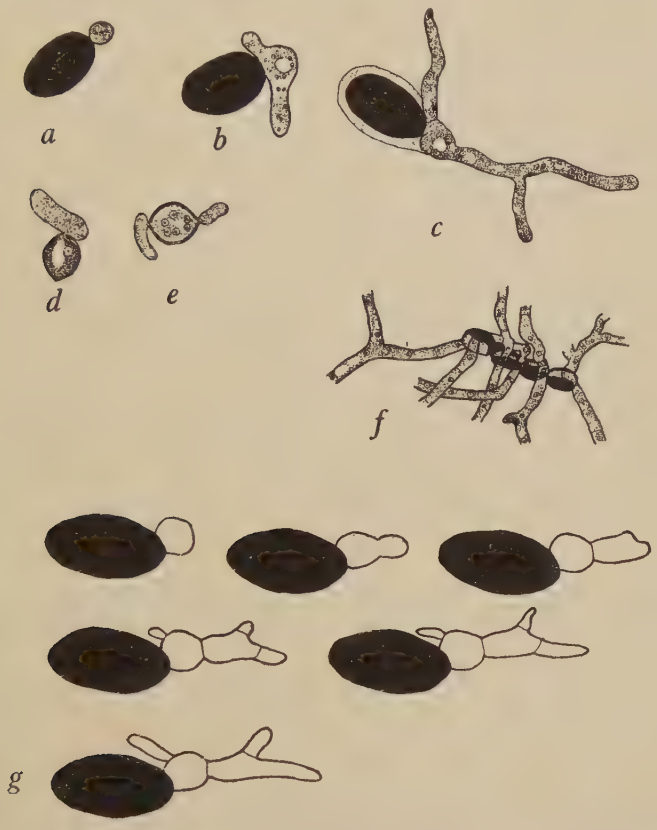
Germinating spores and young perithecia were treated by the glycerine erythrosin method and mounted in glycerine jelly (Gwynne-Vaughan & Barnes, 1937, p. 367). Material for microtoming was embedded through chloroform. The sections were cut from 4 μ to 20 μ thick. The chief stains used were Heidenhain's haematoxylin with light green, or gentian violet with light green (Gwynne-Vaughan & Barnes, 1937, p. 375). Some of the sections of the perithecia of species of *Chaetomium* were mounted in Canada balsam without removing the wax; this method prevents loss of spores caught in the hairs.

Mature perithecia and whole cultures were preserved in Canada balsam after treatment with absolute alcohol and xylol.

Spore discharge was studied by Ingold's method (1928). Single spores were obtained by means of a fine needle or more rarely with a capillary tube or platinum loop.

Germination of spores

In all the species studied the spores germinated readily at normal temperatures without special treatment.



Text-fig. 1. *a–c. Sordaria macrospora.* Germinating spores. × 700. *d. Chaetomium bostrychodes.* Germinating spore. × 700. *e. Chaetomium cochliodes* Saltant SS8. Germinating spore. × 700. *f. Sporormia intermedia.* Spore with all four cells germinating. × 350. *g. Philocopra pleiospora.* Stages in germination of spore. × 350.

(*a*) *Species of* Sordaria, Podospora, Philocopra

A thin-walled globose swelling is first observed which later sends out a cylindrical tube, usually at the point remote from the spore (Text-fig. 1 *a–c*). A few cross-walls are formed, the earliest being at the edge of the original swelling, and side branches grow out. In species of *Podospora* and *Philocopra* germination takes place at the end of the spore opposite the primary appendage (Text-fig. 1).

(*b*) *Species of* Sporormia

In the two species of *Sporormia* studied, the epispore splits and the germ tube grows out. Each cell of the spore is capable of germinating to give rise to a fertile mycelium (Text-fig. 1*f*).

(*c*) *Species of* Chaetomium

Germination of the spores of the species of *Chaetomium* resembles that in the Sordariaceae except that the first globose outgrowth is less marked. The *saltant S.S.* 8 is exceptional in that two germ tubes may emerge from one spore (Text-fig. 1 *d*, *e*).

Vegetative development

The mycelia grow freely and rapidly. The aerial mycelium of members of the Sordariaceae and of *Chaetomium caprinum* and *bostrychodes* stands up very slightly from the substratum but that in the remaining species of *Chaetomium* is fluffy.

Protoplasmic streaming has been observed in both forms of *Sordaria fimicola*, in *S. macrospora* and in *Podospora anserina*. It is especially marked in the last named species, in which movements as rapid as 2 mm. a minute have been seen.

In *Sordaria macrospora* masses of thick walled cells may occur, which somewhat resemble perithecia but are of less definite shape and have no cavity. These are formed more freely if the medium employed does not contain excess of filter paper or particles of dung.

In *Podospora minuta* and *Philocopra anserina*, micro-conidia (the "spermatia" of Ames (1932, 1934; Page, 1936)) have been observed. Up to the present these have not been seen to germinate or to fuse with any part of the perithecial initial.

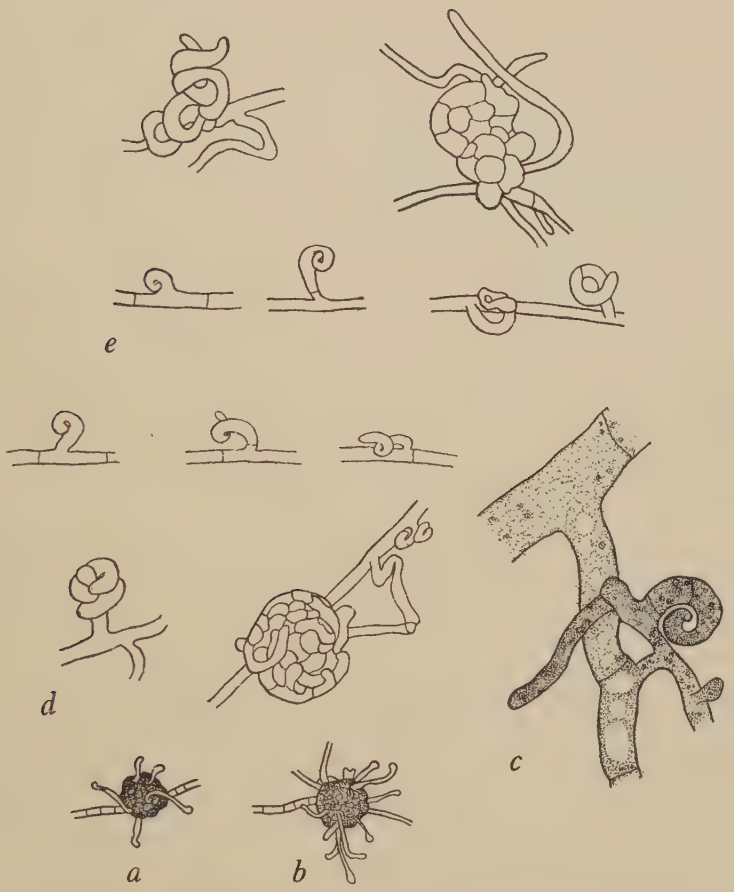
Perithecial initials and perithecia

The time between inoculation and the first signs of perithecia varies between four days in *Chaetomium bostrychodes* and three or more weeks in *Philocopra pleiospora* and *P. curvicolla*.

The position of the first formed perithecia also varies; for example cultures of *Sordaria macrospora* fruit first at the edge of the mycelium and those of *Podospora minuta* near the point of origin. The presence of cellulose also influences the position of perithecia, indeed *Sordaria macrospora* and some species of *Chaetomium* will only fruit on or near filter paper or other cellulose material (Pl. VII, fig. 5).

With the exception of *Sporormia* the earliest stages of the perithecial initials are similar in all the forms studied. A short stout multicellular hypha bends over and forms one or more spiral coils. Branches from

the same hypha or from neighbouring hyphae quickly surround this coil which has meanwhile become complicated and difficult to follow. The sizes of these branches and the complications of the coiling differ in different species (Text-fig. 2). Anastomoses may be frequent among the covering branches and the filaments from which they arise.



Text-fig. 2. Perithecial initials. *a*, *b*. *Philocopra setosa*. × 350. *c*. *Sordaria fimicola*. × 700. *d*. *Philocopra pleiospora*. × 700. *e*. *Podospora minuta*. × 700.

Finally a spherical pseudo-parenchymatous body is formed with numerous filaments arising from it. The spherical structure enlarges and darkens, the neck begins to form from the outer layers and finally the flask-shaped, opaque, or semi-opaque, walled fruit is matured.

No straight perithecial initials such as were described by Dangeard (1907) in *Sordaria macrospora* were observed.

Piehl (1929) and Gries (1936) describe sex organs in *Sordaria fimicola*; no indications of such organs were seen during the present investigation.

In the species of *Chaetomium* studied the perithecial initials are of the sordariaceous type but rather smaller, and the coiling is even more complicated than those of *Sordaria*. If the conditions are favourable these initials are produced in great numbers and so very close together that many do not mature. There is very little difference in the perithecial initials of different species.

The nature and quantity of the secondary mycelium varies with the species. In some forms, notably *Philocopra setosa* and *P. curvicolla*, the outgrowths from the perithecium are characteristic while this is still spherical (Text-fig. 2*a*, *b*). *Philocopra setosa* and some forms of *Podospora minuta* have such an abundant mycelium at the base of the perithecium that a white fluff is visible.

The perithecial initials in the two investigated species of *Sporormia* resemble each other. A few swollen cells are first observed. Longitudinal, as well as transverse, septa are formed in one or more of the cells (Text-fig. 7*a–d*). All the cells do not take part in the formation of the perithecium and the remainder may be seen at the side of the fully developed perithecium..

Mature perithecia

In most of the species studied the perithecial wall is composed of several layers of thick-walled dark brown or black cells, *Sordaria macrospora* has a dense peridium with its outer layers composed of very thick walled cells (Pl. VI, fig. 2).

The necks of the perithecia of all the species of the Sordariaceae investigated are strongly phototropic. In *Podospora minuta*, where the necks are short, the whole body of the perithecium slopes towards the source of light. The necks of *Philocopra curvicolla* are very long and if the plate is turned each day through an angle of 90° a striking series of zig-zags results.

In *Chaetomium* the perithecial necks are much less developed and are not sensitive to light (Pl. VII, figs. 1–4).

The characteristic hairs on the necks of the perithecia of the members of the Chaetomiaceae begin to form early, some appearing as soon as the spherical stage is reached (Text-fig. 3*d*). These hairs may arise from any of the outer layers of the perithecial wall (Pl. VII, fig. 4). In *Chaetomium globosum* the hairs are irregularly wavy and as the perithecia tend to grow very close together a dense mat is formed. *C. murorum* has hairs which have one or two coils right at the tip (Text-fig. 8*i*). These hairs are lighter in colour and thinner than in most forms, and when young have a greenish tinge. The hairs of *C. cochliodes*

and its saltants are irregularly coiled or wavy, whilst those in *C. bostrychodes* and *C. caprinum* are coiled in tight spirals throughout their entire length. *C. bostrychodes* has multicellular hairs and the incrustation of calcium oxalate is very marked. The hairs of the saltant of *C. cochliodes S.S.* 8 are salmon-pink and so differ from those of the parent strain which are dark citrine.

Text-fig. 3. Perithecial initials. *a–d. Chaetomium bostrychodes.* × 700. *e–g. Chaetomium cochliodes.* × 700. *h. Chaetomium murorum.* × 700.

Abnormal perithecia

Perithecia with abnormal necks occur in several species. Branched necks were seen in *Philocopra pleiospora* and *P. curvicolla*, on perithecia growing in their natural habitat as well as on those growing in culture.

Perithecia with two or more distinct necks occur in *Sordaria fimicola*, *Philocopra curvicolla* and *Sporormia intermedia* (Text-fig. 8*k*). Some of the two-necked forms show two distinct groups of asci each arranged so

that their spores would be discharged through the nearest neck. In *Sporormia intermedia* spores may be seen projecting through each of the several necks.

Perithecia may occur with a small portion of their outer walls fused. These "twin" perithecia are also common in Chaetomiaceae.

Asci and spores

The minute size of the nuclei made cytological work impossible. The number of spores to the ascus varies from four to 128.

4 spores to the ascus
- *Sordaria fimicola* (4-spored form)
- *Podospora minuta* (common form)
- *P. anserina*

8 spores to the ascus
- *Sordaria fimicola* (common form)
- *S. macrospora*
- *Podospora minuta* (8-spored form)
- *Sporormia* (all species)
- *Chaetomium* (all species)

16 spores to the ascus
- *Philocopra pleiospora*

64 spores to the ascus
- *Philocopra setosa*

128 spores to the ascus
- *Philocopra curvicolla*

Uninucleate spores
- *Philocopra* spp.
- *Chaetomium* spp.
- *Podospora minuta* (8-spored form)

Binucleate spores
- *Sordaria fimicola* (common form)
- *Sordaria macrospora*
- *Podospora minuta* (common form)

Sporormia intermedia has four nuclei in each cell of its spores and *Sporormia bipartis* has two nuclei in each cell of its spores.

The four-spored form of *Sordaria fimicola* has four nuclei in each normal spore, eight in each giant spore and two in each dwarf spore.

The young ascus in *Sordaria* spp. contains a single large nucleus, the first division is delayed, but the second and third follow rapidly and the spores are then delimited.

The development of the spores in *Podospora minuta* resembles that in *Sordaria*. The short hyaline appendage characteristic of this species soon shrivels up and is often invisible in the mature spore.

In *Podospora anserina*, *Philocopra pleiospora*, *P. setosa* and *P. curvicolla*, the spores are elongated from the first.

In *Philocopra pleiospora* the spores are delimited as shuttle-shaped masses; these elongate and the upper part becomes rounded and the lower part long and cylindrical. The length of the spore at this stage is from one-third to one-half of that of the ascus. The upper part becomes wider and darkens while the lower part shortens and loses its contents, finally being cut off from the rest of the spore. The mature spore is quite black with a long narrow appendage at one end and a short fan-shaped appendage at the other. Both appendages are very fragile and disappear as the spore dries (Text-fig. 5).

The sixty-four spores of *Philocopra setosa* are cut out as shuttle-shaped bodies arranged so that they slope away from the long axis of the ascus in a herring bone formation (Text-fig. 6*a*, *b*). They gradually become oval, with short hyaline appendages. The development in

Philocopra curvicolla is similar except that at the slightly elongated stage the spores slope towards the long axis of the ascus (Text-fig. 6 *d*).

In the species of *Sporormia* studied, eight spore masses are formed. These elongate, then cross walls appear, and the nuclei divide until there are four nuclei in each cell of the spore of *S. intermedia* and two in each cell of those of *S. bipartis* (Text-fig. 7 *h*).

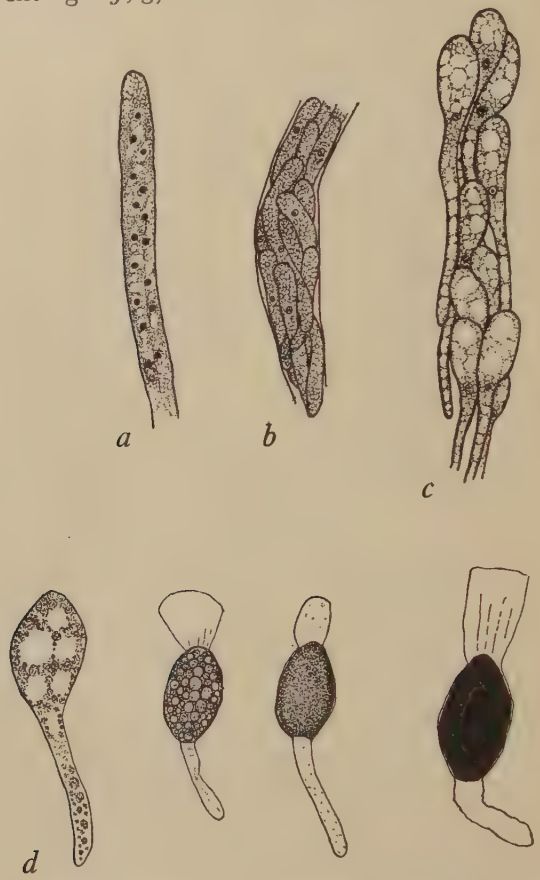
Text-fig. 4. Development of spores of *Podospora anserina*. *a–e*. ×400. *f*. ×200.

Crosiers have been observed in *Sordaria fimicola*, *Sporormia intermedia*, *S. bipartis* and species of *Chaetomium*, but no nuclear detail was obtained.

The time of the ascus formation in relation to the development of the perithecia varies. In most species the asci are not formed until the neck begins to develop, but in the two species of *Sporormia* they can be seen at a much earlier stage.

Most asci mature simultaneously in those species with a small ascus (Pl. VI, figs. 1–6). The fully developed asci of *Philocopra curvicolla* are so large that only a few of these ripen at the same time (Pl. VI, fig. 8).

Paraphyses occur in *Sordaria fimicola*, *S. macrospora*, *Podospora anserina*, *Philocopra setosa*, *Sporormia bipartis*, *Chaetomium globosum*, *C. murorum*, *C. bostrychodes*, *C. cochliodes* and its saltants with the exception of saltant 4 (Text-figs 8*f*, *g*).



Text-fig. 5. *Philocopra pleiospora*. Development of spores. *a–c*. × 350. *d*. × 450.

Spore discharge

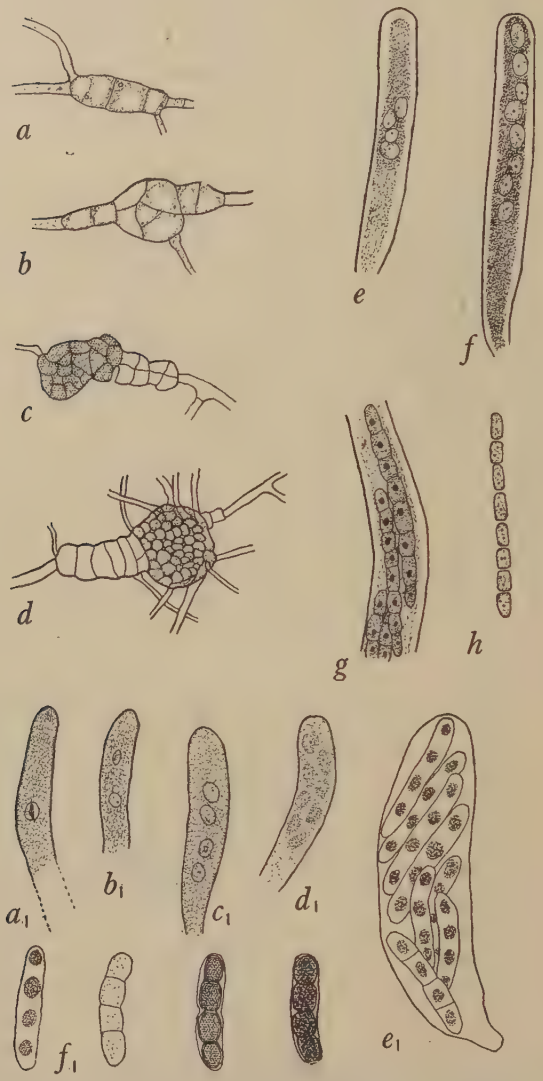
The spores of the Sordariaceae are discharged with considerable force and there is an intimate relation between the illumination and the rate of discharge.

In *Sordaria fimicola*, *Philocopra setosa* and *P. curvicolla* spores were shot off in the dark and the number discharged increased with the light. The number of spores from one perithecium is very large, for example a single fruit body of *Sordaria fimicola* in twelve days discharged three to five thousand spores.

The semi-transparent walls of the perithecia of *Podospora minuta* and *Philocopra curvicolla* allow of observation of the movements of the asci during spore discharge. When spore discharge is hastened by means of 60 % alcohol the process can be watched with ease. All the asci of

Text-fig. 6. Development of spores. *a–b. Philocopra setosa. c–d. Philocopra curvicolla.* *a.* × 200. *b, c.* × 400. *d.* × 700.

Podospora minuta ripen at about the same time and stand at the same level occupying approximately a third of the perithecial cavity (Pl. VI, fig. 4). When ready for discharge they slide slowly upwards one by one, the ascus wall expanding greatly but tapering off at the bottom. The spores keep near the top of the ascus. On reaching the neck there is a sudden jerk and the mass of spores or the complete ascus is ejected.



Text-fig. 7. *Sporormia bipartis*. *a–d*. Perithecial initials. × 700. *e–f*. Stages in development of spores. × 700. *g–h*. Spores showing nuclei. × 700. a_1–f_1. *Sporormia intermedia*. Development of spores. × 700.

Legend to Text-figure 8

Text-fig. 8. *a–g*. *Chaetomium bostrychodes*. *a–e*. Development of spores in ascus. × 700. *f*. Section of perithecium showing asci. × 200. *g*. Group of asci. × 350. *h*. *Chaetomium caprinum*, ascus. × 700. *i–j*. *Chaetomium murorum*. *i*. Surface view of old perithecium with mass of spores in hairs. × 40. *j*. Old perithecium with projecting masses of spores. × 40. *k*. *Sporormia intermedia*. Abnormal perithecia.

Text-fig. 8.

It was impossible to see if the bottom of the ascus remains attached to the base of the perithecium until the wall ruptures.

In *Philocopra curvicolla* the asci contain 128 spores and are very large, only a few ripening at the same time (Pl. VI, fig. 8). The ascus wall distends to a great size before bursting. The masses of spores are shot some distance, the greatest vertical height observed being 20 cm. The neck elongates as the perithecium grows older, the first spores being discharged when it is comparatively short.

The dehiscence of the ascus in *Sporormia bipartis* resembles that in *S. intermedia* (Ingold, 1933). The ascus elongates considerably and a slight constriction is visible usually one-third of the length from the bottom. Careful examination shows that it is the inner wall of the ascus which elongates and that the outer wall forms a thimble-shaped cap. The upper part of the outer wall is often not visible until after the ascus has dehisced. The ascus bursts suddenly and the lower part and the cap are seen plainly (Gwynne-Vaughan & Barnes, 1937, p. 261). In cultures the asci often project from the perithecium (Text-fig. 8*k*) with many spores lying on the surface of the medium very near the perithecia.

The spores of *Sporormia bipartis* frequently break in two. This break also occurs in *intermedia* but the spores more frequently remain intact and can be seen on the lid of the dish with all four cells germinating.

In the Chaetomiaceae the spores are liberated from the ascus within the perithecia and then ooze out (Ingold, 1933). In some species they emerge in long rod-like masses which project above the hairs and may reach to a length two or three times that of the perithecium (Text-fig. 8*i*, *j*). This is especially marked in *Chaetomium bostrychodes* and *Saltant S.S.* 8 of *C. cochliodes* where the long slender rods of white spores projecting from the salmon-pink perithecia are very striking.

In *C. globosum* the spores do not project far but form a dense mass within the hairs.

The hairs undoubtedly help in the distribution of the spores. In those species possessing spirally coiled hairs the latter can be shown to be hygroscopic.

Summary

1. Species of *Sordaria*, *Podospora*, *Philocopra*, *Sporormia* and *Chaetomium* were grown in culture and their development studied.

2. In all genera examined except *Sporormia* the perithecium originates from a coiled hypha about which the peridium grows up.

3. The perithecial initials of the two investigated species of *Sporormia* resemble each other and differ from those of the same family in a very striking manner, since septation occurs in three dimensions.

4. Micro-conidia were observed in *Podospora anserina* and *Podospora*

minuta. They vary greatly in number according to the medium on which the fungus is grown. Further work on their function and behaviour is much to be desired.

The work has been carried out at Birkbeck College, University of London. Thanks are tendered to Prof. Dame Helen Gwynne-Vaughan for much stimulating advice and to Dr J. Ramsbottom for suggesting the study of coprophilous Pyrenomycetes.

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EXPLANATION OF PLATES VI AND VII

Plate VI

Photo-micrographs of longitudinal sections of perithecia.

Fig. 1. *Sordaria fimicola.* × 90.
Fig. 2. *Sordaria macrospora.* × 70.
Fig. 3. *Podospora minuta* (8-spored form). × 110.
Fig. 4. *Podospora minuta.* × 100.
Fig. 5. *Philocopra pleiospora.* × 70.
Fig. 6. *Sporormia bipartis.*
Fig. 7. *Philocopra setosa.* × 100.
Fig. 8. *Philocopra curvicolla.* × 100.

Plate VII

Figs. 1–4. Photo-micrographs of longitudinal sections of perithecia.
Fig. 1. *Chaetomium globosum.* × 130.
Fig. 2. *Chaetomium caprinum.* × 130.
Fig. 3. *Chaetomium cochliodes* Saltant 4. × 70.
Fig. 4. *Chaetomium murorum.* × 200.
Fig. 5. Culture of *Chaetomium globosum* showing perithecia growing over strips of filter paper in agar.

(*Accepted for publication* 25 *May* 1939)

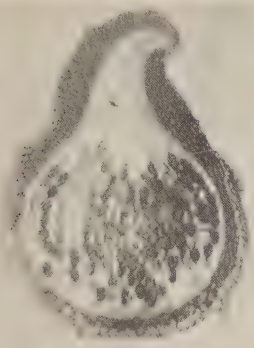

Fig. 1.

Fig. 2.

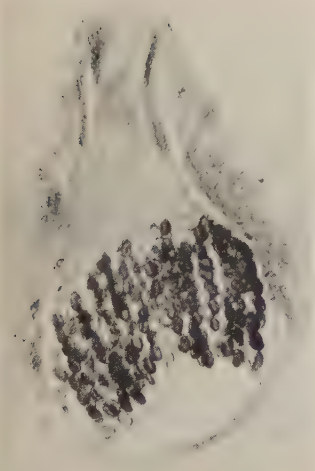

Fig. 3.

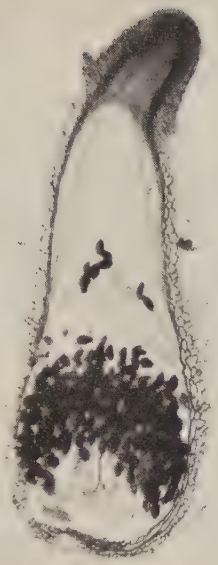

Fig. 4.

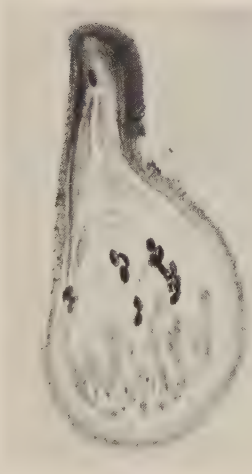

Fig. 5.

Fig. 6.

Fig. 7.

Fig. 8.

A NEW SPECIES OF *PHLEOSPORA* ON *DODONAEA VISCOSA* L. IN CYPRUS

By R. M. NATTRASS

Kenya

(With Plate VIII)

In March 1938 a leaf-spot disease occurred extensively on hedges of *Dodonaea viscosa* L. near the coast town of Famagusta, Cyprus. It appeared as a sudden epidemic, affecting all plants examined in the neighbourhood. A few weeks later it was observed at Nicosia, in the centre of the island, some forty-five miles from Famagusta. From information received (April 1939), it is now established in all parts of the island where the host is grown. Diseased leaves bear numerous small black lesions, each one having in its centre a white mass or tendril of spores easily distinguishable with the naked eye after dew or rain. The mature fructification is a deeply immersed acervulus, the walls of which are composed almost entirely of host tissue; the hymenial layer is confined to the lower part of the cavity. The deep-seated acervulus, the absence of a discernible peridium and the *Septoria*-like spores appear to place the fungus in the genus *Phleospora* rather than in *Cylindrosporium*, if the difference between these two genera can be maintained.

The host is widely distributed throughout the tropics and sub-tropics, and is commonly cultivated in hedges. There is, however, apparently no record of any member of the genera *Phleospora*, *Septoria* or *Cylindrosporium* on *Dodonaea*. The fungus is therefore considered a new species, for which the name *Phleospora Dodonaeae* is proposed.

Description

Spots usually very numerous and traversing the whole thickness of the leaf, visible on both surfaces, scattered or crowded but rarely confluent, round to slightly irregular, occasionally with a diffuse outline, black, the centre of each lesion being occupied above by a white mass or tendril of exuded spores. Acervuli usually only one to each lesion, opening at maturity by a wide pore to the upper leaf surface, deeply immersed, with no distinct peridium, up to 200 μ deep and 200 μ broad. Spores hyaline, cylindrical, tapering abruptly at either end, the distal more or less rounded and the proximal truncate,

curved, sinuous or rarely straight, septa 1–5 (usually 3), 50–90 × 3–5 μ, borne on short obclavate conidiophores arising from the lower part of the acervulus.

Phleospora Dodonaeae n.sp.

Maculis foliicolis, numerosis, sparsis vel gregariis, rare confluentibus, totam crassitudinem foliorum occupantibus et utrimque visibilibus, circularibus vel nonnihil irregularibus, interdum diffuse marginatis, nigris, plerumque acervulum singulum gerentibus. Acervulis profunde immersis, peridio proprio carentibus, e maturitate late apertis, et massam albam sporarum vel cirrhum superne extrudentibus; ad 200 μ altis et 200 μ latis. Conidiis e conidiophoris brevibus, obclavatis, et basalibus assurgentibus, hyalinis, cylindricis, curvatis, vel sinuosis, vel rare rectis, utrimque abrupte attenuatis, apice obtusis, basi truncatis, 3 (1–5) septatis, 50–90 × 3–5 μ.

Hab. in foliis vivis *Dodonaeae viscosae* L. (Sapindaceae), Famagusta, Cyprus (R. M. Nattrass No. 896 Typus).

Type specimens are deposited in the Herbarium of the Imperial Mycological Institute, Kew, and Herb. Cyprus. A culture from the type collection is at the Centraalbureau at Baarn.

EXPLANATION OF PLATE VIII

Fig. 1. *Phleospora Dodonaeae* on leaves of *Dodonaea viscosa* L. About nat. size.
Fig. 2. Acervulus of *P. Dodonaeae*. × 200.
Fig. 3. Spores of *P. Dodonaeae*. × 450.

(*Accepted for publication* 22 *July* 1939)

Fig. 1.

Fig. 2.

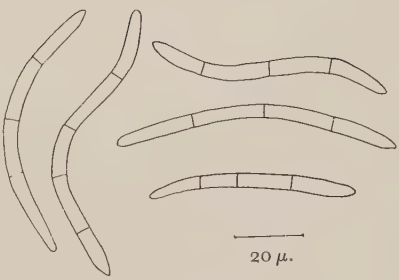

Fig. 3.

AGREEMENT TO USE THE FUNGUS BINOMIALS RECOMMENDED IN THE *LIST OF COMMON NAMES OF BRITISH PLANT DISEASES*

In 1929 the Plant Pathology Sub-Committee of the British Mycological Society (as the present Plant Pathology Committee was then called) issued the first *List of Common Names of British Plant Diseases*, and in 1935 a second edition was published as a separate pamphlet by the Cambridge University Press. The *List*, which it was hoped would contribute towards the standardization of usage of common names of plant diseases within the British Empire, includes also the scientific names of the fungus parasites concerned, and this has been found to be a feature of considerable value. Arrangements have now been made to have the *List* revised more frequently, and any necessary emendations will be published in these *Transactions* or, if desirable, in new editions.

The Plant Pathology Committee, under whose auspices the *List* is compiled and revised, is representative of plant pathologists and mycologists in this country, and every effort is made to ensure that the fungus names included conform to the International Rules of Botanical Nomenclature. It is therefore hoped that the binomials recommended may constitute, within the British Isles, a standard list of names of the more important fungus parasites.

The Council of the British Mycological Society has agreed to the proposal that the names in the edition of the *List* current at the time being should be used in the Society's *Transactions*. A circular letter has also been sent to all bodies of workers likely to publish papers on the fungi in question inquiring whether they, too, would be willing to use the fungus binomials recommended in the *List*. In response to this appeal the following forty-two Offices, Societies and Institutes have agreed to respect the recommended names of fungi as closely as possible in their official publications:

Agricultural Education Association
Agricultural Research Council
Annals of Botany, The Editors
Association of Applied Biologists
Birmingham University, Botanical Department
British Mycological Society
Cambridge University, Botany School
Chelsea Polytechnic, Department of Biology
Cheshunt Experimental and Research Station
Department of Agriculture for Scotland, Seed Testing and Plant Registration Station and Plant Pathology Service, Edinburgh
Ditton Laboratory (D.S.I.R.)

Durham University, King's College, Newcastle-on-Tyne, Department of Agriculture
East Malling Research Station
Edinburgh and East of Scotland College of Agriculture
Edinburgh University, Department of Botany
Forest Products Research Laboratory (D.S.I.R.)
Harper Adams Agricultural College
Hawthorndale Laboratories, Jealott's Hill Research Station (Imperial Chemical Industries Ltd.)
Horticultural Education Association
Imperial Bureau of Pasture and Forage Crops
Imperial Bureau of Plant Breeding and Genetics
Imperial College of Science and Technology, Department of Botany
Imperial Mycological Institute
Kirton Agricultural Institute and Experimental Station
Linnean Society of London
Long Ashton Research Station
Manchester University, Mycological Department
Midland Agricultural College
Ministry of Agriculture and Fisheries, Plant Pathology Laboratory, Harpenden
Ministry of Agriculture of Northern Ireland, Plant Disease Division, Belfast
National Institute of Agricultural Botany
Reading University, Advisory Mycological Laboratory
Rothamsted Experimental Station
Royal Botanic Gardens, Kew
Royal Horticultural Society
Seale-Hayne Agricultural College
South-Eastern Agricultural College
University College, Dublin, Albert Agricultural College, Plant Pathological Division
University College of North Wales, School of Agriculture
University College of South Wales and Monmouthshire, Department of Agriculture
Welsh Plant Breeding Station
West of Scotland Agricultural College

Criticisms of the *List of Common Names* are welcomed; especially at the present time when a third, enlarged and more adequately indexed edition is in course of preparation. Criticisms or suggestions may be sent to the Secretary of the Plant Pathology Committee from whom any other organization wishing to collaborate can obtain full particulars.

G. C. Ainsworth,

Secretary,
Plant Pathology Committee,
Imperial Mycological Institute,
Kew, Surrey.

(*Accepted for publication* 27 *June* 1939)

EMENDATIONS TO THE SECOND EDITION OF THE *LIST OF COMMON NAMES OF BRITISH PLANT DISEASES*

(PREPARED BY A SUB-COMMITTEE OF THE BRITISH MYCOLOGICAL SOCIETY'S PLANT PATHOLOGY COMMITTEE AND APPROVED BY THAT COMMITTEE*)

The second edition of the *List of Common Names of British Plant Diseases*, compiled by the Plant Pathology Committee of the British Mycological Society, was completed late in 1934 and published in booklet form by the Cambridge University Press in March 1935. During the next two or three years it is hoped to prepare and issue a third revised and enlarged edition of this *List*. Meanwhile, in accordance with a decision to keep the *List* periodically revised, certain necessary emendations to the second edition are given below, together with an explanation of each of the more important changes. References are given throughout to the number of the page in the second edition where the change should be made.

Bacterial plant pathogens

The classification and nomenclature of bacteria are still in a confused state and it is thought desirable to avoid substantial changes in the *List* until further decisions are arrived at by the Congress of the International Society for Microbiology. At the Second International Congress for Microbiology, held in London in 1936, however, resolutions regarding the status of the genus *Bacillus* were passed, whereby the use of this name for bacterial species not producing endospores is invalid. The generic name *Bacillus* should not, therefore, be retained by plant pathologists for non-sporing bacteria motile by means of peritrichiate flagella. Only three species of *Bacillus* are given in the *List* as amended, and the alternative generic names suggested for these are *Erwinia* (Bergey's *Manual of Determinative Bacteriology*, 1923) or *Bacterium*, used in the sense employed by Topley & Wilson (*Principles of Bacteriology and Immunity*, 1929–36), who define the genus as Gram-negative, non-spore-forming rods, motile by means of peritrichiate flagella or non-motile. The following emendations should therefore be made. For "*Bacillus phytophthorus* Appel (= *B. atrosepticus* van Hall)" (p. 27) read "*Bacterium phytophthorum* (Appel) Stapp or *Erwinia*

* The sub-committee consisted of W. C. Moore (convener), G. C. Ainsworth, E. W. Mason and Miss E. M. Wakefield.

phytophthora".* For "*Bacillus carotovorus* L. R. Jones" (pp. 31, 35 (2), 37, 39, 41, 43 (2), 77, 81) read "*Bacterium carotovorum* (L. R. Jones) Lehm. or *Erwinia carotovora* (L. R. Jones) Holland"; for "*Bacillus Aroideae* Towns." (p. 67) read "*Bacterium Aroideae* (Towns.) Stapp or *Erwinia aroideae* (Towns.) Holland".

It may be added that at the same Congress it was agreed that bacteriologists accept Article 13 of the International Rules of Zoological Nomenclature, as follows: "While specific substantive names derived from names of persons may be written with a capital initial letter, all other specific names are to be written with a small initial letter."

Orthography of fungus names

Recommendation XLIII of the *International Rules of Botanical Nomenclature*, 3rd ed. 1935 (p. 24) states, "Specific (or other) epithets should be written with a small initial letter, except those which are derived from names of persons (substantives or adjectives) or are taken from generic names (substantives or adjectives)."

It will be noticed that the use of capital letters is not obligatory, and agreement to use the names in the *List* does not necessarily involve capitalizing specific names. To accord with the recommendation, however, the specific epithet of the following names given in the *List* should be written with a small letter:

Tilletia Caries (p. 11), *Phoma Lingam* (pp. 31, 37), *Ramularia Vallisumbrosae* (p. 79) and *Sclerotinia Sclerotiorum* (pp. 23, 25, 29, 41, 43, 45), the last named because the use of the plural form indicates that it was intended as a general term "of sclerotia", and was not taken from the genus. The epithet *Idaei* of the name *Phragmidium Rubi-Idaei* (p. 61) should also be written with a small letter. The epithet *mali* in the name *Sclerotinia laxa* f. *mali* (p. 49) and the specific epithet of *Marssonina panattoniana* (p. 45) should be written with a capital letter.

Species of *Fusarium*

In the second edition of the *List*, completed in 1934, Wollenweber's *Fusarium-Monographie* (1931) was followed in naming species of *Fusarium*. A few changes are now necessary to bring the *List* up-to-date with the nomenclature used by Wollenweber & Reinking in their book, *Die Fusarien*, published in 1935. They are:

For "*Fusarium herbarum* (Corda) Fr. var. *avenaceum* (Fr.) Wr." (pp. 13, 17) read "*Fusarium avenaceum* (Fr.) Sacc."; at the end of the name "*Fusarium Solani* (Mart.) var. *Martii* (Appel & Wr.) Wr." (p. 25) add "forma 3 Snyder"; after the name "*Fusarium bulbigenum*

* The authority for this combination is uncertain, but the name has been used in Denmark and in the *Review of Applied Mycology*.

Cooke & Mass." (p. 47) add "var. *Lycopersici* (Brushi) Wr."; for "*F. Lycopersici* Sacc." (p. 47) read "*F. Lycopersici* Brushi"; delete "var. *fructigenum* (Fr.) Wr." after "*Fusarium lateritium* Nees" (pp. 51, 53).

Other emendations

CEREALS

p. 11	Wheat	
	Whiteheads	For "Whiteheads" read "Take All and Whiteheads". Delete "(Take All)".
p. 13	Foot Rot and Ear Blight	Insert "Brown" before "Foot Rot". The same alteration should be made on p. 17 under Barley—Foot Rot and Ear Blight.
p. 13	Oats	
	Covered Smut	For "*laevis*" read "*levis*".
	Crown Rust	For "*Puccinia Lolii* Niels." read "*Puccinia coronata* Corda". After "(= *P. coronifera* Kleb." insert "and *P. Lolii* Niels.)" The same changes should be made on p. 19 under Rye Grasses—Crown Rust.
p. 15	Leaf Spot and Seedling Blight	After "Ito" insert "and Kuribay.".

PULSE

p. 23	Broad and Field Bean	
	Chocolate Spot	For "? *Bacillus Lathyri* Manns & Taubenh." read "*Botrytis cinerea* Pers." The same change should be made under Chocolate Spot of Vetches and of Sainfoin on the same page.
p. 25	Pea	
	Foot Rot	For "Niessl" read "Vestergr."

POTATO

p. 27	Spraing	For "Propfenbildung" read "Pfropfenbildung".

ROOT CROPS

p. 31	Turnip and Swede	
	White Spot	For "*albomaculan*" read "*albomaculans*".
	Leaf Spot	For "Bolle" read "Sacc." The same change to be made under Cabbage—Leaf Spot on p. 37.
p. 33	Mangold and Beet	
	Rust	For "(Pers.) Tul." read "Lév."
	Leaf Scorch	For "? Parasitic" read "Non-parasitic".

FRUIT

p. 49	Apple	
	White Root Rot	For "(Hart.) Berl." read "Prill." The same change to be made under Pear—White Root Rot (p. 53).
p. 59	Peach and Nectarine	
	Mildew	For "Woron." read "Woronich."

ORNAMENTAL PLANTS

p. 67	Aster	
	Wilt	Delete "*Fusarium* spp." and insert "*Fusarium conglutinans* Wr. var. *Callistephi* Beach".

p. 69	Carnation and Pink	
	Ring Spot	Emend the scientific name to read: "*Didymellina Dianthi* C. C. Burt (*Heterosporium echinulatum* (Berk.) Cooke)". The same change to be made under Sweet William—Leaf Spot (p. 75).
	Wilt and Stem Rot	Delete the whole entry and substitute: "Verticillium Wilt ... *Verticillium cinerescens* Wr. Fusarium Wilt ... *Fusarium Dianthi* Prill. & Delacr. Stem Rot ... *Fusarium culmorum* (W.G.Sm.) Sacc. and *Fusarium* spp."
p. 73	Rose	
	Brown Canker	Delete existing entry and insert: "Brown Canker ... *Cryptosporella umbrina* (Jenk.) Jenk. & Wehmeyer (=*Diaporthe umbrina* Jenk.)."
	Snapdragon	
	Shot Hole	Before "*Cercosporella*" insert "=".
	Sweet Pea	
	Streak	Delete "? *Bacillus Lathyri* Manns & Taubenh."
p. 79	Narcissus	
	Stripe	Delete "?".
	Fire	For "*Botrytis polyblastis* Dows." read "*Sclerotinia polyblastis* Gregory (*Botrytis polyblastis* Dows.)".
p. 81	Gladiolus	
	Storage Rot	For "Machacek" read "McCull. & Thom".
p. 83	Flax	
	Seedling Blight	For "*C. linicolum*" read "*C. linicola*".

Reasons for the more significant changes made

Cereals. The original spelling of the specific epithet in the name *Ustilago laevis* is now retained. *Laevis* is the usual botanical spelling when the word means smooth, probably to distinguish it from *lĕvis* meaning light in weight, and various writers in the past changed the original *levis* to *laevis*, presumably because the name was intended to mean smooth.

Brown (1937) obtained no clear-cut evidence, morphological or pathological, to support Klebahn's division of *Puccinia coronata* Corda into *P. coronata* Kleb. and *P. coronifera* Kleb. (=*P. Lolii* Niels.). She was able, however, to differentiate seven pathologically distinct varieties of *P. coronata* Corda, though only two of these proved to be strictly specialized to their own hosts, and one of the others (var. *Lolii* on *Lolium perenne*) was shown to be capable of infecting seven of the twelve differential hosts tested. The name *P. coronata* Corda is therefore preferred to *P. Lolii* Niels. for the rust occurring on oats and rye grasses.

Pulse. Wilson (1937) has clearly demonstrated that Chocolate Spot of beans, vetches and sainfoin is due to *Botrytis cinerea* Pers. and not, as previously supposed, to bacterial agency; the entry has therefore been amended accordingly. The use of Niessl's name as authority

for the combination *Mycosphaerella pinodes* was an oversight. Niessl called the fungus *Sphaerella* and the change to *Mycosphaerella* was first made by Vestergren (1896) and not by Stone, as stated earlier by Wakefield & Moore (1936).

Root crops. The authority for the name *Alternaria Brassicae* is changed from "(Berk.) Bolle" to "(Berk.) Sacc." According to Bolle (1924) Saccardo did not have Berkeley's species before him when he transferred *Macrosporium Brassicae* Berk. to *Alternaria*, and Bolle therefore claimed to make the combination anew when she had what she considered to be the correct species.

Art. 54 of the *International Rules of Botanical Nomenclature*, 1935 (p. 16) states that "when the specific epithet, on transference to another generic name, has been applied erroneously in its new position to a different plant, the combination must be retained for the plant on which the epithet was originally based", and at the Sixth International Botanical Congress (Amsterdam, 1935, *Proc.* I, 354), it was ruled that such a combination must date from, and be attributed to, the author who first made it, even though at the time he had a specimen which was not the correct species. The name of the fungus causing Leaf Spot of turnip, cabbage, etc., should therefore be written *Alternaria Brassicae* (Berk.) Sacc.

The authority for the rust on mangold and beet is changed from "(Pers.) Tul." to "Lév." The combination *Uromyces Betae* was first made by Léveillé in 1847, and Tulasne did not use the combination until seven years later. Persoon's name must not be cited as he examined only the imperfect (uredo) stage.

Leaf Scorch of beet, believed formerly to be a parasitic disease, has now been shown to be due to unsuitable soil conditions (Stirrup, 1935).

Fruit. The authority for the name *Rosellinia necatrix* is erroneously cited in Saccardo's *Sylloge* (17, 595) as "(R. Hart.) Berl.", and this was copied in the *List*. Hartig (1883) described the species as a *fungus imperfectus* under the binomials *Rhizomorpha necatrix* Hart. and —with special reference to its synnemata—*Dematophora necatrix* Hart. Viala (1891) described the perithecia, but under the imperfect name *Dematophora necatrix* Hart. Berlese (1892) compared Viala's account of the perithecia with those of various species of *Rosellinia* and concluded that the fungus was indeed closely related to *Rosellinia*, but he carefully refrained from calling it *R. necatrix*. The combination *Rosellinia necatrix* first appeared in 1897 when Prillieux compiled the fungus as *Dematophora necatrix* R. Hartig, syn. *Rosellinia necatrix* Berlese, in *Maladies Plantes Agricoles*, II, 133 (1897). Later, Prillieux (1902) announced that he had found the perithecia again, and stated that the fungus should be called *Rosellinia necatrix*, and finally (1904) he published a full account under the title "Sur la déhiscence des périthèces du *Rosellinia necatrix* (R. Hartig) Berlese".

Under International Rules Hartig should not be cited, because both the names he used applied only to the fungus considered as a *fungus imperfectus*. When Viala described the perithecia he again used only an imperfect name. The valid name dates from 1897 when Prillieux first used it, and the correct citation is therefore *R. necatrix* Prill., or *R. necatrix* (Viala) Prill. though *R. necatrix* Berl. in Prill. may be used if desired.

Ornamental plants. Recent work by Ogilvie & Mulligan (1934) has enabled the causal organism of Aster Wilt to be more closely defined, and the etiology of Wilt and Stem Rot of Carnation has now been clearly elucidated by Wickens (1935). The perfect stage of *Heterosporium echinulatum* (Berk.) Cooke has been found and described on Sweet William in Scotland by Burt (1936), and the transference of *Diaporthe umbrina* Jenk. to the genus *Cryptosporella* was made in 1935 by Jenkins & Wehmeyer (1935). Streak of Sweet Peas, hitherto attributed to *Bacillus Lathyri*, consists in all probability of a mixture of diseases, at least one of which is the result of infection by a virus. The perfect stage of *Botrytis polyblastis* Dows. has recently been described by Gregory (1939) as *Sclerotinia polyblastis*, and this name is accepted for the fungus that causes Fire in Narcissus. The reason for the change from "Machacek" to "McCull. & Thom" in the authority for the name *Penicillium Gladioli* has already been given by Wakefield & Moore (1936). *Colletotrichum linicolum* is changed to *C. linicola* because Latin words ending in *-icola* are nouns of common gender with no corresponding adjectival form—see Wakefield & Moore (1936).

Reasons for continuing the use of certain names used in the second edition

Gibberella Saubinetii (pp. 13, 17). Petch (1936) has recently claimed that *G. Saubinetii* (Mont.) Sacc. is synonymous with *G. cyanogena* (Desm.) Sacc., a common saprophyte on herbaceous and woody stems, and that the parasite of cereals usually called *G. Saubinetii* is a distinct fungus identical with *Sphaeria Zeae* Schwein. He has therefore transferred the latter to *Gibberella* as *G. Zeae* (Schwein.) Petch, and it may ultimately be necessary to adopt this name for the cereal parasite, but for the time being it is considered desirable to retain the widely used and familiar name, *G. Saubinetii* (Mont.) Sacc.

Urocystis (pp. 17, 35, 67, 75, 81). The Plant Pathology Committee has proposed* to the International Botanical Congress that *Urocystis* be conserved against *Tuburcinia*, and the name *Urocystis* is therefore retained pending the decision of Congress.

Puccinia anomala (p. 15). In the English-speaking world the Brown Rust of barley is known as *Puccinia anomala* Rostrup (1878). German-

* See these *Transactions*, xxiii, 214 (1939).

speaking countries generally follow Sydow's Monograph in calling it *P. simplex* (Koern.) Erikss. & Henn. (1894), but this name was rejected in the *List* because it is a later homonym of *P. simplex* Peck (1881), a rust on an incompletely determined host resembling *Geum*. *Puccinia Hordei* Otth (1871) has also usually been rejected because it was supposed to be a later homonym of *P. Hordei* Fuckel, a yellow rust of barley. Buchwald (1935), however, has correctly pointed out that *P. Hordei* Fuckel was not described in 1860 as was supposed, but in 1873; and so *P. Hordei* Otth is earlier than *P. Hordei* Fuckel, and, if accepted, is the valid name for the Brown Rust of barley.

As the binomial *P. Hordei* has been applied in recent years only to a yellow rust of barley, however, it has been decided not to use it, without further consideration, as the accepted name for Brown Rust of barley but to regard it for the time being as a *nomen ambiguum*.

Gloeosporium concentricum (p. 37). The parasite that causes Leaf Spot of cabbage, cauliflower, etc., is listed as *Gloeosporium concentricum* (Grev.) Berk., and it has been so known since 1850. Von Höhnel (1924) revised the genus *Cylindrosporium* as used in Saccardo's *Sylloge* and pointed out that this species started as *C. concentricum* Greville (1823) and is the type species of Greville's originally monotypic genus. The species has recently been redescribed by Thomson (1936). So far as is known, none of the 155 species that have been compiled to date as *Cylindrosporium* in Saccardo's *Sylloge* is congeneric with Greville's species; and if *Gloeosporium concentricum* (Grev.) Berk., be re-established as the type of *Cylindrosporium*, they will all need to be renamed.

It is proposed to continue the use of the name *Gloeosporium concentricum* (Grev.) Berk. for the time being, but unless some action is taken to conserve the use of the name *Cylindrosporium* in a different sense from that of Greville, it will not be correct to do so indefinitely.

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NOMINA GENERICA CONSERVANDA

CONTRIBUTIONS FROM THE NOMENCLATURE COMMITTEE OF THE BRITISH MYCOLOGICAL SOCIETY. II

(Secretary: E. M. Wakefield)

This contribution includes statements concerning a further thirteen of the names which were proposed for conservation in the lists published as a supplement to the International Rules, 1935. For some of the names, as *Phallus* and *Marssonina*, conservation is unnecessary, because the name is already valid according to the present Rules. There are other names in these lists on which it would be inadvisable to make any decision until more is known of the taxonomy of the genera in question. *Tromera*, which is briefly dealt with here, is an example. Since the original lists were made up, the adoption of the type method for fixing the application of names has necessitated some modification of the proposals as given. In order to conserve modern usage, which is the purpose of these proposals, it is advisable to state precisely that such genera as *Aposphaeria*, *Coniothyrium* and *Sphaeropsis* shall be attributed to Saccardo and conserved against the original uses of the names, which become earlier homonyms. The type chosen for these names must be such as will fix the application of the name in the sense required. Hence it will be found that the recommendations given under these names differ somewhat from the proposals in the Supplement to the Rules.

Peziza Fr. (1822) versus *Aleuria* Fuckel (1869)

Peziza Dill. ex Fr. *Syst. Mycol.* II, i, 40 (1822).

Peziza, as taken up by Fries, consisted of 326 species disposed in two main divisions: A, *Discina* (cf. p. 38, *loc. cit.*) with 318 species, and B, *Helotium* with eight species. The second group, in which the name *Helotium* was used as that of a subgenus, may be here left out of consideration. The first group, *Peziza* proper, was divided into three series: I, *Aleuria*, with 88 species; II, *Lachnea*, with 116 species; and III, *Phiala*, with 112 species. *Aleuria*, which included all the large terrestrial forms, was again divided into four tribes, of which the first and second, *Helvelloideae* and *Geopyxis*, included all the large, fleshy, terrestrial forms. The *Helvelloideae* were again divided into *Acetabula* (stipitate), *Cochleatae* (sessile, irregular and pruinose) and *Pustulatae* (subsessile, entire, and externally granular). The section *Cochleatae* included *Peziza badia* Pers. and *P. aurantia* Pers., while *P. vesiculosa* Bull. and *P. pustulata* (Hedw.) Pers. were included in *Pustulatae*.

So much subsequent splitting of the genus has taken place that some authors, as Gillet (*Champ. Fr. Discomycet.* (1879)), Rehm in Rabenhorst (*Kryptogamen-Fl. Deutschl.* I, iii (1887–96)), Magnus in Dalla Torre & Sarnth. (*Flora von Tirol* (1905)) and Velenovsky (*České Houby* (1920) and *Discomycet. Bohem.* (1934)) have rejected the name *Peziza* altogether. Where retained, it has been used in very different

senses. Thus the older works, as Cooke, *Handbook British Fungi* (1871) and Phillips, *Man. British Discomycet.* (1887), included in *Peziza* all the fleshy Discomycetes, which they divided into subgenera. Saccardo (*Syll. Fung.* VIII, 73 (1889)) stated that his interpretation of *Peziza* included the sections *Cochleatae* and *Pustulatae* of Fries. Lindau in Engler & Prantl, *Nat. Pflanzenfam.* I, i (1896) used the name in a wide sense with various subgenera, but Migula (*Kryptogamen-Fl. Deutschl.* III, iii (1913)) followed Saccardo. On the other hand, Massee (*British Fungus Flora*, IV, 424 (1895)) applied the name *Peziza* only to the large, regular, usually terrestrial forms, citing it as "*Peziza* Dill. emend." He practically confined it to the group *Pustulatae* of Fries, using *Otidea* for the more ear-shaped forms. Clements & Shear (*Gen. Fungi* (1931)) define *Peziza* with the type *P. vesiculosa*, and Seaver (*North Amer. Cup Fungi* (1928)) uses the name in the same sense but cites as type *P. cochleata* Linn., which in the text he queries as a synonym of *P. badia* Pers.

Fuckel (*Symb. Mycol.* (1869)) proposed the general *Pustularia* Fuck. (for *Peziza vesiculosa* and its allies) and *Aleuria* Fuck. (for *Peziza aurantia* and another species), and at the same time unjustifiably established a new genus "*Peziza* Fuck." for small stipitate forms which would now be included in *Helotium*. *Peziza* Fuck. has not been adopted by anyone else.

Boudier (*Hist. Class. Discomycet. Eur.* (1907)), in setting out an entirely new classification of the Discomycetes based on microscopic characters, used the name *Peziza* for *P. aurantia* Pers., and took up Fries's series name *Aleuria* (citing it as "*Aleuria* Fr." as did Gillet) for Pezizas of the *Peziza vesiculosa* group.

Aleuria Fuckel, *Symb. Mycol.* p. 325 (1869).

The genus *Aleuria* Fuck. was proposed with two species, *A. aurantia* (Pers.) Fuck. (=*Peziza aurantia* Pers.) and *A. rhenana* Fuck., which has been sometimes transferred to *Sarcoscypha*. The first may therefore be regarded as the type species. Fuckel has been followed by Rehm (*op. cit.*), Velenovsky (*op. cit.*) and Seaver (*op. cit.*). On the other hand, Gillet (*op. cit.*) took the name "*Aleuria* Fr." and used it in the same wide sense as *Peziza* of Saccardo and others. Boudier (*op. cit.*) followed Gillet in taking up *Aleuria* Fr. but confined it to *Peziza vesiculosa* and the species grouped with it. *Aleuria* (Fr.) Gill. was, however, a later homonym of *Aleuria* Fuck., and Boudier's use of the name is untenable.

Discussion.

The proposal which is set out in Maire's list of *nomina conservanda* contains two implications. The first is to implement the Rule (Art. 51) that when a genus is divided into two or more genera the name must be retained for one of them. The second is the proposal to typify *Peziza* with the species *P. aurantia* Pers., which would make it a synonym of *Aleuria* Fuck.

The name *Peziza* has not disappeared from modern literature, as has the comparable name *Sphaeria*, hence there is a strong case for upholding the working of Art. 51. As to the second point, however, namely, the choice of type, it is generally considered undesirable to choose as type a species which has since become the type of another genus, unless there is a very strong reason for doing so. It is necessary to examine whether Fries's concept of *Peziza* is so closely bound up with *P. aurantia* that that species should be accepted as the type.

Most of the authors before Fries, such as Dillenius, Micheli, Nees, Hedwig, etc., employ such words as "concava", "calyciforme", "fungoides cava", "Becherschwämme", "Becherpilze", etc., in describing the fungi which Fries regarded as *Peziza*. Fries himself (*loc. cit.* p. 38), in giving a synopsis of the genus, described it as "Cupula subconcava, mox aperta, disco nudo". A form resembling a cup is therefore his outstanding concept of the genus, and if any of his groups can be regarded as more typical than the others it would seem that the group *Pustulatae* is such, with its regular, more or less sessile, cup-shaped apothecia.

Of the species included in the *Pustulatae*, *Peziza vesiculosa* Bull. is probably the best known. *P. pustulata*, Hedwig's figure of which Fries cited as representative of the group, is perhaps less well known. *P. badia* Pers., which Seaver regards as the type,

on the basis of its suggested synonymy with *P. cochleata* Linn., is less suitable, since there appears to be some difference of opinion concerning the identity of *P. cochleata* Linn.

Recommendation. It is recommended that the valid name *Peziza* Fr. should be retained, but with the lectotype *P. vesiculosa* Bull. rather than *P. aurantia* Pers.

Tromera Massal. (1858) versus *Biatorella* de Not. (1846) and *Sarea* Fr. (1825) emend. O. Kuntze (1898)

Sarea Fr. *Syst. Orb. Veg.* 86 (1825).

Fries originally described this genus (*loc. cit.*) without mentioning the species included, except that they were species of *Helotium* of other authors. In the *Elenchus*, II, 14 (1828), however, he listed two species, *Sarea complanata* Fr. and *S. difformis* Fr. *S. complanata* was transferred back to *Helotium* in Saccardo's *Syll. Fung.* VIII (1889). *Sarea difformis* has been variously referred to *Biatorella* (Wainio in *Medd. Soc. Fl. Faun. Fenn.* X, 143 (1883)) or *Tromera* (Arnold in *Flora*, LVII, 85 (1874)). It is included among the lichens (under *Biatorella*) by A. Lorrain Smith (*Monogr. Brit. Lichens*, ed. 2, II (1926)) and by Zahlbruckner (*Cat. Lich. Univ.* V, 37 (1928)), though the latter adds "potius fungus".

The name *Sarea* has not been adopted by any writer since Bonorden (in *Bot. Z.* XI, 293 (1853)), except by O. Kuntze (*Rev. Gen. Pl.* III, ii, 515 (1898)).

Tromera A. B. Massal. apud Arnold in *Flora*, XLI, 507 (1858).

This genus was founded with two species, *T. xanthostigma* (Rabenh.) Massal. and *T. sarcogynoides* Massal. The first is a synonym of *T. resinae* (Fr.) Korb. (= *Biatorella resinae* (Fr.) Mudd) and the second of *Sarea difformis* Fr. Both species are included among the lichens by A. Lorrain Smith (*op. cit.*) and by Zahlbruckner (*op. cit.*).

The name *Tromera* was, however, used for a genus of fungi by Saccardo (*Syll. Fung.* VIII, 469 (1889)). Nannfeldt (*Morph. Syst. nicht-lichen. Inop. Discomycet.* 333 (1932)) regards the genus as intermediate between lichens and Discomycetes, and quotes *T. xanthostigma* Massal. as "Pseudotypus". Anzi (*Cat. Lichenum*, 117 (1860)) also regarded *Tromera* as intermediate in position between lichens and fungi.

Tromera has been used as a lichen genus by Korber, *Parerga Lichenol.* 453 (1865), and by Magnusson in Rabenhorst, *Kryptogamen-Fl. Deutschl.* IX, V, 1, 45 (1935).

Biatorella De Not. in *Giorn. Bot. Ital.* II, i, 192 (1846).

This genus was monotypic, being founded on *B. Rousselii* (Dur. & Mont.) De Not., a lichen (= *B. fossarum* (Duf.) Th. Fr.). Most lichenologists rightly therefore use the name for a genus of lichens, and usually include in it the species *B. difformis* (Fr.) Wainio and *B. resinae* (Fr.) Mudd. There has, however, been some doubt whether such species are lichens or fungi, hence *Biatorella* appears as a fungus genus in Massee, *British Fungus Flora*, IV, 95 (1895); Lindau in Engler & Prantl, *Nat. Pflanzenfam.* I, i, 230 (1896); Rehm in Rabenhorst, *Kryptogamen-Fl. Deutschl.* I, iii, 303 (1889); Magnus in Dalla Torre & Sarnth. *Flora von Tirol*, 347 (1905); Boudier, *Hist. Class. Discomycet. Eur.* 156 (1907); Migula, *Kryptogamen-Fl. Deutschl.* III, iii, 924 (1913); Brenckle, "North Dakota Fungi, I" in *Mycologia*, IX, 278 (1917); Velenovsky, *Mon. Discomycet. Bohem.* 71 (1934).

Clements & Shear (*Genera of Fungi* (1931)) list *Biatorella* twice, as a fungus and as a lichen; on p. 314 they cite *Biatorella* De Not. with type *B. pinicola* (Mass.) Th. Fr., and on p. 319 they have *Biatorella* Th. Fr. with type *B. fossarum* (Duf.) Th. Fr.

Since the genus was monotypic and founded on a lichen, and is still used by lichenologists, the name cannot be used for a genus which consists wholly of fungi.

Recommendation. As opinions differ whether the species included in *Tromera* Massal. and *Sarea* Fr. are really lichens or fungi, and as several modern lichenologists apparently accept them as lichens, it is recommended that no decision be taken on this proposal. The name *Biatorella* can be used only for a genus of lichens.

Mytilidion Duby in Sacc. (1883) versus *Mytilinidion* Duby (1861)

Mytilinidion Duby in *Mem. Hysterinées*, 62 (1861), type species *M. aggregatum* (DC) Duby (monotypic).

Mytilidion Duby in Sacc. *Syll. Fung.* II, 760 (1883) [cited as *Mytilidion* Duby *Hyster.* p. 62 (sub nomine mendoso *Mytilinidion*)].

The change from *Mytilinidion* to *Mytilidion* is more than a correction of an unintentional mistake in spelling. Duby intended to frame a diminutive from the Greek μυτίλος but inserted an extra syllable; Saccardo recast Duby's name into a more correct form. Under Rules 59 and 70 this is now held to be illegitimate.

Recommendation. As Saccardo recast Duby's original name more than fifty years ago, as his emendation has been universally accepted, as no advantage would appear to accrue from reverting to the original, and as there is authority for conserving a later accepted spelling against an original one, it is recommended that *Mytilidion* Duby in Sacc. (1883) (type species *M. aggregatum* (DC. ex Fr.) Duby), be conserved against *Mytilinidion* Duby (1861).

Phallus Pers. (1801) emend. Fr. (1849) versus *Ithyphallus* (Fr.) Fischer (1888)

The above proposal is unnecessary because *Ithyphallus* (Fr.) Fischer, as a generic name, is of later date than *Phallus* Pers., even if the latter is dated from Fries, 1849.

Actually, however, *Phallus* Pers. (1801) is the valid name for the genus containing *P. impudicus*, according to the present Rules, and it is not necessary to add "emend. Fr." The nomenclature of the Gasteromycetes begins with Persoon's *Synopsis* (1801). In this work Persoon included under *Phallus* (a name taken from Micheli, *Gen. Plant.* (1729)), six species, of which the first was *P. impudicus* Linn., but the next four were species now placed in four different genera (*Clathrus*, *Dictyophora*, *Mutinus* and *Lysurus*). Fries (*Syst. Mycol.* II, ii (1823)) divided *Phallus* Pers. into four subgenera ("Tribus"): *Hymenophallus*, *Ithyphallus*, *Leiophallus* and *Cynophallus*, *Phallus impudicus* being included under *Ithyphallus*. Later (*Summ. Veg. Scand.* II, 434 (1849)) he used *Phallus* for *P. impudicus* only.

When E. Fischer worked out the Phalloideae for Saccardo's *Syll. Fung.* he adopted *Ithyphallus* Fr. as the name of a genus, rejecting the name *Phallus* altogether. This is contrary to Art. 51 of the Rules, which provides that when a genus is divided into two or more genera the generic name must be retained for one of them, and if there is a type species, for the genus containing that type.

Now the name *Phallus* was in use long before 1801. It occurs first in Micheli, *Gen. Plant.* (1729), where several species, without binary names, were enumerated, and the figure given (t. 83) is unmistakably *P. impudicus*. Linnaeus also (*Sp. Plant.* ed. I (1753)) uses the name *Phallus* with the sole species *P. impudicus* Linn. Obviously therefore *P. impudicus* must be the type of the name *Phallus*, and when the genus *Phallus* Pers. is divided the name must be kept for that section containing the type *P. impudicus* Linn.

The name *Ithyphallus* (Fr.) Fischer has been used by Fischer in Saccardo, *Syll. Fung.* VII (1888) and in Engler & Prantl, *Nat. Pflanzenfam.* I, i**, (1899). In the second edition of Engler & Prantl, however (VII*a*, 102 (1933)), Fischer has reverted to *Phallus*, not on grounds of priority but because of its inclusion in Maire's list of proposed *nomina generica conservanda* which was published in 1930. *Ithyphallus* was also used by Massee, *British Fungus Flora*, I (1892); Hollós, *Gasteromyceten Ungarns* (1904); and by Coker, *Gasteromycetes of Canada and Eastern United States* (1928). If it is desired to retain this name it will have to be conserved against *Phallus* Pers., which is the valid name.

Recommendation. As *Phallus* [Mich.] Pers. is the valid name for the genus typified by *P. impudicus* Linn., it is recommended that the proposal to conserve it be rejected as unnecessary.

Mutinus Fr. (1849) versus *Aedycia* Raf. (1808) and *Cynophallus* (Fr.) Corda (1842)

Aedycia Raf. in *Desv. J. Bot.* I, 222 (1808).

This genus was proposed by Rafinesque with a very scanty description: "Champignon sans volve, tubuleux, troué au sommet, gélatineux, composé d'utricules contenant les graines." Two species were enumerated: *A. rubra*, described as cylindrical, reddish, with brownish mucilage at the apex, and *A. alba*, merely said to be white.

O. Kuntze (*Rev. Gen. Pl.* III, ii, 441 (1898)) took up the name *Aedycia* for *Mutinus caninus* Fr., on the ground that Berkeley & Curtis had identified it with their genus *Corynites*, which is regarded as a synonym of *Mutinus*. Kuntze gave no reference but cited the date 1880. This date apparently refers not to Berkeley & Curtis, but to a note by W. R. Gerard (*Bull. Torr. Bot. Cl.* VII, 30 (1880)), who suggested that *Aedycia* Raf. was the same as the later *Corynites* Berkeley & Curtis, and that neither appeared to be distinct from *Mutinus* Fr. The name *Aedycia* has not been taken up by any other author.

Cynophallus (Fr.) Corda, *Icon. Fung.* V, 29 (1842).

This name is not mentioned by the proposer of the motion to conserve *Mutinus* Fr., but it also antedates *Mutinus* and has been used by Berkeley (*Outlines*, 298 (1860)) and more recently by Rea (*Brit. Basidiomycetae*, 23 (1922)). The name *Cynophallus* was first applied by Fries (*Syst. Mycol.* II, 284 (1823)) to a section of the genus *Phallus* Pers., with the single species *P.* (*Cynophallus*) *caninus* Huds. It was taken up as a generic name by Corda (*loc. cit.*) who did not make the binary combination. Apparently Berkeley (*loc. cit.*) first used the combination *Cynophallus caninus*.

Mutinus Fr. *Summ. Veg. Scand.* II, 434 (1849).

The name *Mutinus* was proposed as a generic name by Fries in place of his *Cynophallus* (subgenus) of 1823. It has come into general use in modern floras and text-books, as for instance Hollós, *Gasteromyceten Ungarns*, 29 (1904); Fischer in Saccardo, *Syll. Fung.* VII, 12 (1888) and in Engler & Prantl, *Nat. Pflanzenfam.* I, i**, 290 (1899), and ed. 2, VII*a*, 97 (1933); Massee, *British Fungus Flora*, I, 45 (1892).

Recommendation. As *Mutinus* Fr. (1849) is widely used in mycological floras, text-books, etc., it is recommended that this name should be conserved against *Aedycia* Raf. (1808), which has never been used except by O. Kuntze, and against *Cynophalius* (Fr.) Corda (1842).

Coniothyrium Sacc. (1880) versus *Clisosporium* Fr. (1832) and *Coniothyrium* Corda (1840)

The published proposal is to conserve *Coniothyrium* Corda emend. Sacc. (1880) with type species *C. Diplodiella* (Speg.) Sacc. against *Clisosporium* Fr. (1832).

Clisosporium Fr. *Syst Mycol.* III, ii, 334 (1832)

This genus was first published in *Nov. Fl. Suec.* V, 80 (1814), but legitimate publication dates from 1832, with two species, *C. lignorum* Fr. (type), and *C. herbarum* Fr. The latter is altogether unknown and has disappeared from literature. The genus was accepted by Montagne in *Ann. Sci. Nat.* 4 sér. V, 341 (1856) and by Bonorden, *Abhandlungen*, I, 139 (1864). In 1884 *Clisosporium lignorum* Fr. was included by Saccardo (*Syll. Fung.* III) in *Coniothyrium*, and the genus lapsed. It was taken up again by O. Kuntze (*Rev. Gen. Pl.* III, ii, 459 (1898)) as the valid generic name for all the species compiled by Saccardo in *Coniothyrium*. This suggestion has not been accepted by anyone else.

Coniothyrium Corda *Icon. Fung.* IV, 38 (1840).

This genus was founded with four species which were compiled by Saccardo in 1884 as follows:

(1)	*C. Pini* Corda	*Leptothyrium Pini* (Corda) Sacc.
(2)	*C. palmarum* Corda ...	*Coniothyrium palmarum* Corda.
(3)	*C. subtile* Corda	*Aposphaeria subtilis* (Corda) Sacc.
(4)	*C. glomeratum* Corda ...	*Aposphaeria glomerata* (Corda) Sacc.

As founded by Corda the genus consisted of elements of three distinct genera, and it has been emended by different authors in three different ways as follows:

(i) *Coniothyrium* Corda emend. Saccardo in *Michelia*, II, 7 (1880). Saccardo restricted the genus to species that form immersed pycnidia with dark-coloured aseptate spores. This use derives quite naturally from Corda's second species *C. palmarum*, but Saccardo took as examples two species known to him, *C. Fuckelii* Sacc. and *C. insitivum* Sacc. The genus as emended by Saccardo has been accepted in all later monographic treatments of the group.

In *Syll. Fung.* III (1884) he listed 79 species; by 1931 (*Syll. Fung.* XXV) the number had mounted to 344 and it is still rising. Saccardo's usage was accepted by Allescher in Rabenhorst, *Kryptogamen-Fl. Deutschl.* I, vii (1901); Lindau in Engler & Prantl, *Nat. Pflanzenfam.* I, i** (1900); Diedicke in *Kryptogamen-Fl. Mark Brandenburg*, IX (1914); Migula in *Kryptogamen-Fl. Deutschl.* III, iv (1921); Petrak & Sydow in Fedde *Repertorium*, Beihefte XLII, iii (1927); Grove in *British Stem and Leaf Fungi*, II (1936). It was rejected by O. Kuntze (1898), who transferred to *Clisosporium* Fr. the 79 species compiled in *Syll. Fung.* III (1884) under *Coniothyrium*; it was also rejected by von Höhnel (1917).

(ii) *Coniothyrium* Corda emend. O. Kuntze in *Rev. Gen. Pl.* III, ii, 459 (1898). The genus as emended by O. Kuntze is based on the third and fourth species *C. subtile* Corda and *C. glomeratum* Corda, and it is reserved for species with superficial markedly ostiolate pycnidia, and hyaline aseptate pycnospores. Kuntze transferred to this genus the 53 species compiled in *Syll. Fung.* III under *Aposphaeria*. He has not been followed in any monographic treatment of the group.

(iii) *Coniothyrium* Corda emend. von Höhnel in *Hedwigia*, LIX, 265 (1917). This genus is based on Corda's first species *Coniothyrium Pini*→*Sacidium Pini* (Corda) Fries→*Leptothyrium Pini* (Corda) Sacc.→*Rhizosphaera Pini* (Corda) Maubl.

When so based, it is available only for two or three species, which possess very characteristic pycnidia erumpent on conifer needles, and hyaline pycnospores. Von Höhnel also proposed that the species compiled in "*Coniothyrium* Sacc. non Corda" should be transferred to *Microsphaeropsis* von Höhnel. His proposal has not been accepted in any monographic treatment.

Coniothyrium Sacc. in *Michelia*, II, 7 (1880).

When it is sought to select a type for the genus *Coniothyrium* Corda emend Sacc., from Corda's four original species, only *C. palmarum* Corda is acceptable. Petrak & Sydow (in Fedde *Repertorium*, Beihefte XLII, 331 (1927)), however, have pointed out, that as in a number of species of *Coniothyrium*, its pycnospores are apt to become 1-septate, and that it is in fact intermediate between the genera *Coniothyrium* and *Microdiplodia*. As this species is the only link between Corda's original genus and the genus of Saccardo's use, it is best that the latter should be cited as *Coniothyrium* Saccardo. Of the two examples given by Saccardo, *C. insitivum* Sacc. is now placed in another genus (*Cytoplea*), and *C. Fuckelii* Sacc. alone remains. That is a well-known species both on the host plant and in culture, and it has been suggested by Petrak & Sydow (*op. cit.* p. 333) as the lectotype for "*Coniothyrium* Corda emend. Sacc." *Coniothyrium Diplodiella* (Speg.) Sacc. which is suggested in the published proposal is not a typical *Coniothyrium*, and has recently been transferred to *Coniomela* von Höhnel.

Recommendation. It is recommended that the large, well known and almost universally accepted *Coniothyrium* of Saccardo's use be attributed to Saccardo himself; that *Coniothyrium* Sacc. (1880), type species *C. Fuckelii* Sacc., be conserved against *Clisosporium* Fr., and that *Coniothyrium* Corda be rejected.

Aposphaeria Sacc. (1880) versus *Aposphaeria* Berk. (1860) and *Coniothyrium* Corda emend. O. Kuntze (1898)

The published proposal to conserve *Aposphaeria* Sacc. (1880) (viz. Berk. 1860) against *Coniothyrium* Corda emend. O. Kuntze is complementary to the proposal to conserve *Coniothyrium* Corda emend. Sacc. If the previous recommendation is accepted, the proposal to accept *Coniothyrium* Corda emend. O. Kuntze is automatically rejected. The genus *Aposphaeria* itself is, however, in a nomenclaturally unsound state, and the use of the name should be stabilized.

Aposphaeria Berk. *Outlines*, 315 (1860).

The genus was founded with two species, *A. acuta* Berk. and *A. complanata* Berk. The diagnosis ran as follows: "Perithecia at length free, distinct from the matrix, furnished with a papillaeform ostiole. Spores minute."

Aposphaeria Sacc. in *Michelia*, II, 4 (1880).

Saccardo adopted Berkeley's genus but gave a slightly different diagnosis: "Perithecia Phomae sed superficilia, exquisitius papillata. Spermog., Melanommae, Cucurbitariae. Ex: *A.* (*Phoma*) *Pulviuscula* Sacc."

The distinction between pycnidia which become superficial (as in Berkeley's diagnosis), and those which are superficial from the first (as in Saccardo's), is a small one. The different diagnosis is due no doubt to the fact that in Berkeley's species the pycnidia occur on herbaceous stems (e.g. *Urtica*) in which the outer cortex separates off leaving the pycnidia exposed. Nevertheless, a similar distinction is drawn in the classification of the Ascomycetes, where immersed perithecia are classified in *Leptosphaeria* and perithecia free from the beginning in *Melanomma* or *Zignoella*.

Saccardo, *Syll. Fung.* III (1884) compiled both of Berkeley's species in the genus *Phoma*, where they are still retained. The genus *Aposphaeria* in Saccardo's sense now contains over 150 species and has been accepted in all monographs that include the Sphaeropsidaceae-Hyalosporae; it has been rejected only by O. Kuntze. Under the type-species method of fixing genera, the genus can no longer be called *Aposphaeria* Berk., with both of Berkeley's species excluded. It will save confusion to accept the position that Saccardo (*Michelia*, II, 4 (1880)) erected another genus, to cite it as *Aposphaeria* Sacc. and to conserve it against *Aposphaeria* Berk.

Recommendation. As the substantial genus *Aposphaeria* of Saccardo's use is accepted in all the relevant monographs, it is recommended that it be attributed to him; that *Aposphaeria* Sacc. (1880), type species *A. Pulviuscula* (Sacc.) Sacc., be conserved against *Aposphaeria* Berk., and that *Coniothyrium* Corda emend. O. Kuntze be rejected.

Sphaeropsis Sacc. (1880) versus *Sphaeropsis* Lév. (1842) and *Macroplodia* Westend. (1857)

The proposal which is before Congress (*International Rules*, 1935, p. 125) is to conserve "*Sphaeropsis* Lév. in: Demidoff, *Voy.* (1845) 112, *pro minima parte*, Sacc. *Mich.* II (1880) 115.—Type: *S. Visci* (Sollm. *Hedw.* II, 187) Sacc. *loc. cit.*" against *Macroplodia* Westend. *Bull. Acad. Brux.* II, 2 (1857) 562.

The intention of the proposer was obviously to conserve Saccardo's conception of the genus *Sphaeropsis*, but the proposal is rendered absurd by the confused citation of two of Léveillé's papers as if they were one. As shown below, the original *Sphaeropsis* in Demidoff's *Voyage* was monotypic and an Ascomycete. The date 1845 refers not to this but to a paper in the *Ann. nat. sci.* which was cited by O. Kuntze when he proposed using the name "*Sphaeropsis* Lév. (1845) ex maxima parte" in place of *Phoma* Desm. The smaller part of Léveillé's use of *Sphaeropsis* in 1845 was, however, not *Sphaeropsis* in the sense of Saccardo. *Sphaeropsis* Sacc. was an entirely

new genus and not an emendation of Léveillé's genus. It is also necessary to consider *Haplosporella* Speg., which has been adopted by Petrak & Sydow in place of *Sphaeropsis* Sacc.

Sphaeropsis Lév. in *Voyage Russ. Mérid. et la Crimée de M. Anatole de Demidoff*, II, 112 (1842).

This genus was based on one species, *S. conica* Lév. This species later proved to be an Ascomycete with brown, two-celled spores and is now known as *Amphisphaeria conica* (Lév.) Ces. & de Not. (As *Amphisphaeria* dates only from 1863, it is obvious that it should be conserved against *Sphaeropsis* Lév.) Meanwhile Léveillé (*Ann. sci. nat.* (3), IX, 258 (1848)) made the combination *Diplodia conica* (Lév.) Lév., and Durieu & Montagne (*Expl. Sci. Alger.* I, 501 (1846)) renamed it *Sphaeria Leveillei*. In 1845 Léveillé (*Ann. sci. nat.* (3), III, 62) added six new species to *Sphaeropsis* without redefining the genus. The first, *S. citrinella*, was later transferred to *Zythia*, the second to *Dothiorella* and the last four to *Phoma*. On the basis of this O. Kuntze (*Rev. Gen. Pl.* III, ii, 522 (1898)) proposed using *Sphaeropsis* Lév. (1845) emend. O. Kuntze in place of *Phoma* Desm.

Sphaeropsis Sacc. in *Michelia*, II, 105 (25 April 1880), non Lév.

Saccardo recharacterized *Sphaeropsis* for *Diplodia*-like fungi with brown, one-celled spores, and transferred and redescribed *S. Visci* (Sollm.) Sacc., based on Roumeg. *Fung. Sel. Gall. Exs.* 283. *Sphaeropsis* as so redefined was used throughout the *Sylloge Fungorum* and by most mycologists and plant pathologists, including Lindau in Engler & Prantl, *Nat. Pflanzenfam.* I, i**, 363 (1900); Allescher in Rabenhorst, *Kryptogamen-Fl. Deutschl.* I, vii (1901–3); Diedicke in *Kryptogamen-Fl. Mark Brandenburg*, IX (1912–15); F. L. Stevens, *Fungi which cause Plant Disease* (1913); Migula, *Kryptogamen-Fl. Deutschl.* III, iv (1921); Grove, *British Stem and Leaf Fungi*, II (1937); Clements & Shear, *Genera of Fungi* (1931). *Sphaeropsis* is the basis of the names *Sphaeropsidales* and *Sphaeropsidaceae*, both of which must lapse if *Sphaeropsis* be rejected (Art. 66, *International Rules*).

Macroplodia Westend. in *Bull. Acad. Brux.* II, 2, 562 (p. 19 of reprint) (1857), type species *M. Aquifolia*.

The genus was designated as like *Diplodia* but with continuous spores. The type species was transferred to *Sphaeropsis* by Saccardo. Grove (*op. cit.* p. 44) considered it the younger condition of *Diplodia ilicifolia* Desm. Petrak & Sydow (*op. cit.* below) state that Westendorp's specimen is lost. The name *Macroplodia* has rarely been used by recent mycologists.

Haplosporella Speg. (as "*Aplosporella*") in *Anal. Soc. Cientif. Argentina*, X, 155 (p. 34 of reprint) (1880).

The month of publication has not been ascertained, but apparently it was later than April, the date of *Sphaeropsis* Sacc. A type species was not designated, but Spegazzini first mentioned *Diplodia Parkinsoniae* Speg., which he transferred, together with three other species, to his new genus; he also described as new four other species. Petrak & Sydow (in Fedde *Repertorium*, Beihefte XLII, 16 (1926)) considered *Haplosporella* to be the same as *Sphaeropsis* Sacc., adopted the former name and described 80 species, many of which they transferred from *Sphaeropsis*. But *Haplosporella* is still treated as distinct from *Sphaeropsis* by Clements & Shear (*op. cit.*) and Grove (*op. cit.*).

Recommendation. As *Sphaeropsis* in the sense of Saccardo is well known and widely used by mycologists and plant pathologists, and as its replacement would cause great confusion, it is recommended that the name *Sphaeropsis* be attributed to Saccardo, and that *Sphaeropsis* Sacc. (1880), with type species *S. Visci* (Sollm.) Sacc., be conserved against *Sphaeropsis* Lév. (1842) and *Macroplodia* Westend. (1857).

Phoma Desm. (1849) versus *Phoma* Fries (1823) and *Sphaeropsis* Lév. emend. O. Kuntze (1898).

This proposal is complementary to the proposal to conserve *Sphaeropsis* Sacc.

Phoma Fr. *Syst. Mycol.* II, ii, 546 (1823).

This genus was based on *P. pustula* (Pers.) Fr. (now *Hypospila*, a Pyrenomycete) and four other species, none of which is known to be a *Phoma* in the modern sense.

Phoma Desm. in *Ann. sci. nat.* (3), XI, 278 (1849).

As here defined with a new diagnosis, *Phoma* included *P. strobiligena* Desm. first and nine other species including *P. lingam* Desm. *Phoma* Desm. would now be considered *Phoma sensu lato*. Saccardo (*Michelia*, II, 4 (1880) as "*Phoma* Fr. em.") cited, as examples of *Phoma*, *P. denigrata* (now *Phomopsis*) and *P. herbarum* Westend. The latter species was suggested as type by Clements & Shear (1931) and in the *Supplement to the International Rules* (1935).

Since about 1850 *Phoma* Desm. has been used by mycologists (with the gradual segregation of species into *Phomopsis* and other genera), including the authors cited for *Sphaeropsis*. There are now hundreds of species of *Phoma*.

Sphaeropsis Lév. ("1845"), ex parte maxima, was suggested by O. Kuntze (*Rev. Gen. Pl.* III, ii, 522 (1898)) to replace *Phoma*. This is untenable if the recommendation re *Sphaeropsis* is adopted.

Recommendation. It is recommended that *Phoma* Desm. (1849) be conserved against *Phoma* Fries (1823), and that as general use of the name *Phoma* follows Saccardo, *P. herbarum* Westend. be taken as the nomenclatural type.

Mastomyces Mont. (1848) versus *Topospora* Fr. (1835)

Topospora Fr. *Flora Scanica* 347 (1835).

The name *Topospora* was first used by Fries (1835) in a key to the genera included in the group "Dichaenei" of Pyrenomycetes. No species were mentioned. In the *Fungi Natalenses* (*Kongl. Vet. Akad. Handl.* 1848, 162–153 (1849)) Fries gave a better description of the genus and mentioned two species of *Sphaeria*, *S. uberiformis* Fr. and *S. proboscidea* Fr., as belonging to it; a binary combination was made for *Topospora uberiformis*. The genus was described in the *Summ. Veg. Scand.* II, 415 (1849), and binary combinations given for both species. Petrak & Sydow (*Ann. Mycol.* XXI, 366 (1923)) have discussed the genus, and consider that Fries's use of the name in 1835 is invalid, on account of the very brief description and the absence of any list of species. According to Art. 37 of the *International Rules*, however, the name was validly published, since it was accompanied by a description which can be deduced from the sectional characters in the key. A reversion to this name on grounds of priority was suggested by Saccardo (*Syll. Fung.* XI, 536 (1895)) and by Bubák (*Ann. Mycol.* IV, 118 (1906). In the Conspectus at the beginning of vol. XIV of Saccardo's *Sylloge* the name is used in preference to *Mastomyces* Mont. It has not, however, been taken up by anyone else.

Mastomyces Mont. in *Ann. sci. nat.* (3), X, 134 (1848).

The genus *Mastomyces* was erected by Montagne for *Sphaeria uberiformis* Fr., which is therefore the type species, but he arbitrarily changed the specific epithet to *Friesii*, citing *Sphaeria uberiformis* as a synonym. Montagne naturally did not recognize that this species belonged to Fries's genus *Topospora* of 1835, since it was some months later (1849) that Fries enumerated the included species (in *Fungi Natalenses*, which although published in a volume for 1848 actually appeared in 1849). *Mastomyces* was used by Saccardo in *Syll. Fung.* III, 456 (1884) and in *Syll. Fung.* XI, 536 (1895), but in the latter place he noted that *Topospora* Fr. was the earlier name. *Mastomyces* was also used by Lindau in Engler & Prantl, *Nat. Pflanzenfam.* I, i**, 373 (1900); Allescher in Rabenhorst, *Kryptogamen-Fl. Deutschl.* I,

vi, 992 (1901), where Saccardo's note is quoted; Lind, *Danish Fungi*, 139 and 445 (1913); Clements & Shear, *Gen. Fungi*, 184 (1931).

The genus includes so far only two species, both of which are believed to be conidial stages of species of Cenangiaceae. Edith K. Cash (in *Mycologia*, xxvi, 267 (1934)) has recently provided evidence that *Mastomyces uberiformis* is probably connected with *Godronia urceolus* (A. & S.) Karst. and not with *Sceroderris ribesia* as previously supposed.

Recommendation. As the name *Topospora* Fr. has never been taken up, and the binary combinations made under it were published later than that under *Mastomyces* Mont., it is recommended that the name *Mastomyces* Mont. (1848), with type species *M. uberiformis* (Fr.) Karst., should be conserved against *Topospora* Fr. (1835).

Stagonospora Sacc. (1884) versus *Hendersonia* Berk. (1841) and *Psilothecium* Fuckel (1865)

Hendersonia Berk. in *Ann. Mag. Nat. Hist.* (1), vi, 430 (1841).

The genus *Hendersonia* Berk. (not "Berk. & Br." as given in the proposal in the *Supplement to the International Rules*, 1935) was founded on the species *Hendersonia elegans* Berk., which is therefore the type species. The specific diagnosis included a statement that the spores were colourless. Saccardo omitted the species when compiling vol. iii of the *Sylloge*, but on p. 436, under *Hendersonia commutata* Sacc., he has the following synonymy: "*H. elegans* Sacc. nec Berk. (quae *Stagonospora*)."

Psilothecium Fuckel, *Fung. Rhen. Exs.* no. 1571 (1865).

Fuckel published a description of the genus *Psilothecium* on the label of one species, *P. innumerabilis* Fuck., which was issued as No. 1571 of his *Fungi Rhenani*. In *Symb. Mycol.* 116 (1869) he referred to it as an imperfect form of *Myriocarpa Cytisi* Fuck. It was compiled by Saccardo (*Syll. Fung.* iii, 446 (1884)) as *Stagonospora innumerabilis* "Fuck." Von Höhnel (*Sitzungsber. naturf. Fr. Berlin*, cxvi, 622 (1907)) examined Fuckel's specimen and found it to be a mixture of a *Cercospora*, named by him *C. innumerabilis* (Fuck.) v. Höhn., and an unripe pycnidium.

Stagonospora Sacc. in *Syll. Fung.* iii, 445 (1884).

Saccardo (*Michelia*, ii, 8 (1880)) proposed *Stagonospora* as a subgenus of *Hendersonia* Berk. to include forms with colourless spores, and cited as examples *H. paludosa* Sacc. & Speg. and *H. graminella* Sacc. At that time he thought that the type species of *Hendersonia*, *H. elegans* Berk., had coloured spores, and in *Syll. Fung.* iii, 418 (1884) he retained the name *Hendersonia* for the species with coloured spores, citing it as "*Hendersonia* Berk. em.", and raised *Stagonospora* Sacc. (p. 445) to generic rank. Yet on p. 436 he had realized that *Hendersonia elegans* Berk. had hyaline spores, and he had referred it to *Stagonospora*.

As *Hendersonia elegans* Berk. is the type species of *Hendersonia* Berk., that genus is both an earlier synonym of *Stagonospora* Sacc. and an earlier homonym of "*Hendersonia* emend. Sacc." (1884). Hence unless *Hendersonia* Berk. is rejected altogether, the 228 species cited in *Syll. Fung.* under *Stagonospora* must be transferred to *Hendersonia*, and another generic name must be found for the 439 species listed under *Hendersonia*. Von Höhnel (*Ann. Mycol.* xvi, 29 (1918)) proposed to rename the latter *Phaeohendersonia*, but this name has not been taken up.

Clements & Shear (*Genera of Fungi* (1931)) cited "*Hendersonia* Westend." with *H. sarmentorum* Westend. as lectotype, but there is no such genus. Westendorp gave no generic diagnosis nor did he emend Berkeley's genus in any way; he merely included "*Hindersonia*" *sarmentorum* and two other species of "*Hindersonia*" in a list of Belgian fungi. *Hindersonia* Moug. & Nestl., an entirely different genus, is cited as a *nomen rejiciendum* under the proposal to conserve *Ceriospora*.

Recommendation. To validate universal usage it is recommended that *Stagonospora* Sacc. (1884) be conserved against *Hendersonia* Berk. (1841). and that the name

Psilothecium Fuck. be rejected. *Stagonospora paludosa* (Sacc. & Speg.) Sacc., one of the two species originally included in the subgenus *Stagonospora* by Saccardo, is recommended as a suitable lectotype. We know of no reason for the choice of *S. microscopica* (Fr.) Sacc. which is suggested by the proposer of the motion in the *Supplement to the International Rules* (1935).

Hendersonia Sacc. (1884) versus *Hendersonia* Berk. (1841) and *Sporocadus* Corda emend. O. Kuntze (1898)

Sporocadus Corda *Icon. Fung.* III, 23 (1839) emend. O. Kuntze, *Rev. Gen. Pl.* III, ii, 531 (1898).

Kuntze (*loc. cit.*) pointed out that the genus *Sporocadus* Corda included four species, two of which should be placed in the previously described genus *Diplodia* (1834), while the other two fall within the genus now known as *Hendersonia* Sacc. Consequently, even if *Stagonospora* Sacc. is conserved against *Hendersonia* Berk., the name *Hendersonia* Sacc. cannot be retained unless it is conserved against the older name *Sporocadus* Corda.

Hendersonia Berk. in *Ann. Mag. Nat. Hist.* (1), VI, 430 (1841).

The history of this name and its misapplication by Saccardo has been given under the previous proposal.

Hendersonia Sacc. in *Syll. Fung.* III, 418 (1884).

Saccardo cited the name as "*Hendersonia* Berk. em." and applied it to species with coloured spores. His interpretation has been followed in almost all modern works. *H. biseptata* Sacc., which was first mentioned under the section *Euhendersonia* in *Michelia*, II, 8 (1880) and again in the *Sylloge*, is suggested as a suitable lectotype.

Recommendation. It is recommended that the almost universally accepted *Hendersonia* of Saccardo's use be attributed to Saccardo himself, and that *Hendersonia* Sacc. (1884) with lectotype *H. biseptata* Sacc. be conserved against both *Hendersonia* Berk. (1841) and the obsolete *Sporocadus* Corda, and further that *Phaeohendersonia* v. Höhn. (see previous proposal) be rejected.

Marssonina Magnus (1906) versus *Marssonia* Fischer (1874) non Karst. (1858) and *Marsonia* Sacc. (1880)

Marssonia Karst., *Fl. Columb.* I, 97 (1858–61) (Gesneriaceae).

The genus was based on *M. primulina* Karst. It has been accepted by Urban, *Symb. Antill.* II, 347 (1912) and by Willis, *Flowering Plants and Ferns* (1919). It was regarded as a synonym of *Napeanthus* Gardn. by Benth. & Hook. (*Gen. Pl.* II, 108 (1873); by Clarke in DC. *Mon. Phan.* V, i, 164; and in *Index Kewensis*, Fasc. III, 172 (1894); but in *Index Kewensis*, Suppl. V, 162, 1911–15 (1921) *Marssonia subacaulis* Urban is accepted as such. The name is not mentioned by Fritsch in this treatment of Gesneriaceae in Engler & Prantl, *Nat. Pflanzenfam.* IV, iii*b* (1897).

Marssonia Fischer in *Rabenh. Fung. europ. ex.* No. 1857 (1874) (Melanconiaceae).

The genus was erected in honour of Dr T. F. Marson. It was a later homonym of *Marssonia* Karst., but has been used by Allescher in Rabenhorst, *Kryptogamen-Fl. Deutschl.* I, vii, 595 (1903); Lindau in Engler & Prantl, *Nat. Pflanzenfam.* I, 1**, 405 (1900).

Marsonia Sacc. in *Michelia*, II, 11 (1880).

Saccardo adopted Fischer's genus but spelt the name with one "s". His spelling was retained for 80 species in the *Sylloge* up to vol. XXV, 1931. In that volume fourteen further species of *Marsonia* are listed, but three are also given under *Marssonina* P. Magn. (syn. *Marsonia* Fisch. sec von Höhnel).

Marssonina P. Magnus in *Hedwigia*, XLV, 88 (1906).

Magnus, recognizing that *Marssonia* Fischer was a later homonym, changed the name to *Marssonina*, and transferred 66 species and one variety, mainly from Saccardo's *Syll. Fung.* The name *Marssonina* has come into fairly general use, particularly in works on plant pathology. It was adopted by Lind, *Danish Fungi*, 484 (1913); Lindau, *Mikroscop. Pilze*, ed. 2, 144 (1922); Pape in Sorauer, *Handb. Pflanzenkr.* ed. 5, III, ii, 50 (1932); Grove, *British Stem and Leaf Fungi*, II, 272 (1937). Clements & Shear (*Genera of Fungi*, 383 (1931)) regard *Marssonina* as a synonym of *Septomyxa* Sacc., but at the same time they retain "*Marsonia* Fisch.", with the same type species, *M. Potentillae*.

As *Marssonia* Karst. is apparently little used there might be some argument for conserving *Marssonia* Fischer against it, but on the other hand *Marssonina* is now very generally used for the fungus genus, and it seems unnecessary to suggest displacing what is the valid name.

Recommendation. As *Marsonia* Sacc. is only an orthographic variant of *Marssonia* Fisch., which is a later homonym of *Marssonia* Karst., and therefore invalid, it is recommended that *Marssonina* P. Magnus be accepted as the valid name of the fungus genus.

(*Accepted for publication* 22 *July* 1939)

Note. The outbreak of war makes it unlikely that the Committee will continue this work for a time. It is hoped that mycologists in neutral countries may be sufficiently interested to carry on the examination of the published lists of proposed *nomina conservanda* so that material may be ready when the next International Congress meets.

REVIEWS

Fungi of India. Supplement 1. By B. B. MUNDKUR. Scientific Monograph No. 12. The Imperial Council of Agricultural Research. Delhi. Pp. 54. Large 8vo. Price 2*s.* 3*d.*

This is a supplement to Butler and Bisby's *Fungi of India* published in 1931. Of its fifty-four pages, nine are occupied with "References", four with the index, and two with the "Introduction". From the last we learn that Myxomycetes are included (a group omitted by Butler and Bisby) and that 433 new records have been added to the 2351 of the main work; 6 additional Myxomycetes are recorded in an Addendum, making a grand total of 2874. This seems a very small number for such a large country and could probably be doubled or trebled with little difficulty. One new species is described—*Mycosphaerella Tinosporae* Ajrekar—and five (not six as stated) new combinations are made. The author quotes Recommendation XLIII of the *International Rules*: "Specific (or other) epithets should be written with a small initial letter, except those which are derived from names of persons (substantives or adjectives) or are taken from generic names (substantives or adjectives)." On the plea of saving time in "looking up" (i.e. learning) many reject this recommendation, but in the present work there is a method which is new to me—"Following the practice of the *Review of Applied Mycology* and *Fungi of India* small initial letters have been used except in the case of new species or new combinations." There can be no doubt that compromise is the basis by which international agreement is to be obtained in nomenclature, but to adopt a recommendation if a name is new and reject if it is old is nonsensical. Further, if the author would look at Recommendation XI (*c*), he would find that it is suggested that "Letters foreign to botanical Latin should be transcribed and diacretic signs suppressed", and possibly would not have written *Léveillula.* In his note on the use of this generic name he is sadly mistaken in stating that to use "an imperfect generic name" for the perfect stage is opposed to the *International Rules.* A large number of names would need to be perpetrated if a generic or specific name could not include all stages.

The species in the list are accompanied by literature references. Often there are fairly full notes on interesting points. Where any change of identification or nomenclature of a fungus recorded in the main work is made, it is placed in square brackets. In spite of needless blemishes the list will doubtless prove useful to workers in India.

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Spore Discharge in Land Plants. By C. T. INGOLD. Small 8vo. pp. vi and 178. 75 figs. Oxford University Press. 7*s.* 6*d.*

This small book gathers together in a handy and attractive form much scattered information about the more important facts of violent spore discharge in land plants, especially in fungi. The subject-matter is arranged so far as possible according to the types of mechanism but as each group of cryptogams tends to have its own particular types of spore-discharge mechanism there is little deviation from a "systematic" arrangement. The first type described is the water-squirting mechanisms of *Pilobolus, Empusa* and *Basidiobolus*; followed by those of Ascomycetes: (1) Discomycete type, (2) Pyrenomycete type, and (3) Erysiphales type. As

throughout the book, there is a great deal of reference to the work of A. H. R. Buller in these chapters, though the author has given a short account of his own observations including some unpublished results on the conditions affecting spore-discharge in the Pyrenomycetes. The attribution to "Buller (1934) and others" of the trivial observation that in many Discomycetes, "when an apothecium puffs, the bursting asci produce an audible sound, like the hissing of steam escaping from fine jets" would suggest that this is something new whereas it was observed by Haller over two hundred years ago. The second type of discharge is that due to the rounding off of turgid cells; it is met with in *Conidiobolus villosus*, *Sclerospora* and the aecidiospores of rust fungi. The third type is the drop-excretion mechanism of basidiospore discharge, in agarics, rusts, smuts and "shadow yeasts"; the author suggests a possible explanation of this depending on the surface energy of the excreted drop. Finally there is the catapult mechanism of *Sphaerobolus*. The implication that *S. stellatus* is confined to dead-wood in this country is misleading: it is occasionally found on horse-droppings. The remaining types dealt with are in cryptogams other than fungi; with the exception of *Battarrea*. In the concluding chapter there is a discussion on the benefit due to the production of enormous numbers of spores in fungi. *Ganoderma applanatum* has been estimated to produce 5,000,000,000,000 spores each year—the fruit bodies in fairy rings go on for centuries with astronomical numbers also. One fruit body replaces one fruit body on an average and consequently there is enormous wastage.

One of the most difficult problems in mycology is to assess any survival value to mechanisms which provide for the effective disposal of myriads of spores which come to nothing. The author suggests that in a natural vegetation the opportunities for a given species to establish new individuals may be so few and far between that millions of millions of spores may perhaps hardly suffice. The idea he puts forward is that it is important to get to the position before a rival with similar nutritional requirements. With greater proportional increase in spore production the chances are greater, but with equal proportionate increase or decrease the chances are equal. "The colossal wastage in spore production would thus appear to be not so much the fault of the environment as of competition." It is difficult to account for abundance and scarcity of species on such a basis. Some nearly related species have comparable numbers of spores, similar spore discharge mechanisms, and equal chances of spore dispersal—the one, however, is common, the others rare. It may be argued that a common species gives as many times the number of spores as there are times the number of fruit bodies and thus has greater chances, but production of fruit bodies is not the same each year and many species are local; if we argue that it is the mycelium that is all-important we need only divide our numbers by some factor—if we have a mycelium lasting twenty years no spore need produce a mycelium for twenty years for the number of fruit bodies to remain the same. I am unable to put forward any suggestion to explain the facts and refer to the problem so fully only because I believe it to be of fundamental biological importance.

The book is easy to read and gives sufficient detail for most readers. But perhaps "in the case of the cleistocarps" (p. 56) and "due, probably, to undue stickiness" (p. 63) might be polished in later editions.

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